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ITS RELATION TO THE NASAL CAVITIES AND ITS DESTRUCTIVE
EFFECTS UPON THE EYE.

By C. R. HOLMES, M. D.,

CINCINNATI, O.

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Erysipelas is treated of systematically in works on General Medicine, General Surgery and Dermatology. It is an important and serious disease and merits the attention which these authors give it. Although a germ disease it still prevails extensively in this latter era of asepsis and antisepsis, invading the best equipped and best managed hospitals, and the cleanest and most elegant private houses, and even occurs spontaneously and without apparent cause in absolutely new hospitals. If you will read the paragraphs that treat of the etiology of this disease in the works that I have referred to, you will see that there is some important thing in its causation that is unexplained or that an assumption is made that is not borne out by the facts as they are available to us today. The word "idiopathic"—now almost obsolete in every depart-

ment of medicine—still appears in their pages. They feel the necessity of apologizing for this word, however, and explain that this must be taken to mean that the specific germ, introduced from without, gains entrance to the body through a wound so slight as to have been unnoticed or so transient as to have been healed and invisible before the onset of the erysipelas. In short, the implication almost invariably contained in their articles is that the infection, the identity of which has now been established for many years, is brought mysteriously to the patient from without—either air borne through the infected atmosphere of a hospital ward, or on the hands or instruments or clothing of the surgeon. In many instances—indeed, in a great many instances—this explanation is appealed to because no other is within the knowledge of the authors—but recent studies have brought me to the conclusion that there is a vast mass of literature bearing upon this very mystery that it is now time to bring together and lay before the general physician and surgeon and dermatologist, that they may be enabled to penetrate the mystery and advise their students of the most important source of the erysipelatos infection, so that an attempt at prophylaxis will deliver into the hands of the rhinologist and aurist a class of cases that we, unfortunately, too often see only after serious damage is imminent or has already been done. I am referring to the literature of Rhinology, Otology and Ophthalmology. These special branches are not often carefully studied by the writers on the general subjects already referred to and that they should have missed the significant articles scattered through the magazines of five languages—especially when the American literature contains but scanty reference to the matter—is not to be wondered at.

That we may forge an absolutely complete chain of evidence, I beg that you will allow me to take it up, link by link; and therefore we must establish, first, what erysipelas really is.

Erysipelas is an acute, infectious, contagious disease, evidencing itself by a characteristic inflammation of the skin and mucous membrane and occasionally the subcutaneous tissues, with a tendency to spread by continuity of tissue, and with systemic disturbances varying from very mild to very profound. It undoubtedly has a tendency to spontaneous recovery even in severe cases.

The exciting cause of erysipelas is a streptococcus—indeed we may now say the streptococcus. “Streptococci are most frequently encountered in their parasitic abode.” Though capable of existing for a short time outside of the animal body, their slow growth on culture media and their short lives, point to direct transference from body to body. Although these characteristics are not absolutely uniform, I beg you to observe that they militate strongly against the idea that erysipelas is an air borne disease, and on this important point I will submit to you further evidence presently.

Streptococci are subject to many variations in form. They appear as diplococci, in chains of from four to six smaller cocci, and in longer chains with both large and small segments. There is no apparent specific difference between streptococcus longus, streptococcus brevis, streptococcus conglomeratus, streptococcus gracilis and streptococcus involutus, since comparatively slight changes in culture media or a sojourn in an animal organism (and this is a very important point in our study of this subject) can change the morphologic characters of the organism. The rate of growth on artificial media differs in streptococci from different sources, but all are of comparatively slow growth. The virulence of streptococci from different sources also differs most markedly, not only in transferring the cocci from animals of one race to those of another, but in transferring from animal to animal of the same race. In other words, environment, the culture medium employed, may increase or decrease the virulence of the germ and its toxins. Streptococci are pus producers. They may be associated with all stages of pyogenic infection from local inflammation to general septicemia. They are encountered in inflammations of all mucous and serous membranes, in bones and in such organs as the liver and the brain. Among other infections they are found either alone or combined with other organisms in spreading phlegmon and cellulitis, anginas, lobular pneumonia, synovitis and osteomyelitis, lymphangitis, pleuritis, peritonitis and peurperal septicaemia. It was formerly thought that the streptococcus of Fehleisen (streptococcus erysipelatis) was specifically different from those concerned in other inflammations. For instance, John Collins Warren (71), writing on erysipelas in 1894, said “Fehleisen concludes, from his observations, that the erysipelas coccus is a specific microbe which will always reproduce the disease when inoculated even in

the smallest quantities. . . . The question of the identity of the erysipelas coccus with the streptococcus pyogenes has frequently been raised and authorities are not yet entirely agreed upon this point. The coccus of erysipelas is larger than the streptococcus. . . . Many modern observers concede that the erysipelas coccus causes not only erysipelas, but also abscess, but many others believe that when suppuration occurs, it is due to pyogenic cocci which have become inoculated secondarily, and that suppuration is therefore merely a complication of the disease. Experimental inoculation with erysipelas cocci has, in the hands of one observer, always produced erysipelas, while inoculations with the streptococcus produced phlegmonous inflammation."

Since this was written, however, it has been satisfactorily demonstrated that the streptococcus of erysipelas may become pyogenic and the streptococcus pyogenes may produce a characteristic erysipelatous inflammation of the skin, and we find one of the standard textbooks of the day on pathology (58) declaring that "the conditions which they induce depend upon the route by which they gain access to the body, and especially upon their virulence which may be exalted to an extraordinary degree by certain conditions of cultivation and passage through animals. In short, it has been shown that the activity of a streptococcus, which only causes abscess, may be exalted to a virulence by which erysipelas, purulent infiltration or fatal septicemia results. These experiments serve to sustain the views as to the common ancestry and close relationship of the various streptococci as indicated by morphologic and physiologic considerations, and to emphasize the desirability of considering them as a single group. Besides their more active manifestations streptococci may lie latent." One of the most important studies that led to the setting forth of this modern dictum was that of Fraenkel (72) who reported to the Hamburg Society of Physicians that from the pus contained in abscesses that had developed in the course of an attack of erysipelas, he had been able to cultivate an organism that corresponded to the streptococcus erysipelatis. He had also observed a case in which the development of facial erysipelas was ascribed to infection from a felon in the pus of which streptococci were found. In a case of extensive facial erysipelas, there was also suppuration of the subcutaneous tissues of the greatly swollen eyelids and of the inter-

muscular and intramuscular tissues of the neck. In the pus and in the edematous fluid streptococci were found microscopically and by culture. In experimental results it appeared that the streptococcus produced at one time lymphangitis or a phlegmon, at another erysipelas or peritonitis. He had succeeded in inducing erysipelas by injections of streptococcus pyogenes into the ears of rabbits, and he had also occasioned suppuration and peritonitis by inoculation of erysipelas cultures. Nor were the results confined to one species of animal.

Prof. William H. Welch, Johns Hopkins University, Baltimore, in his reply to a recent communication from me requesting his opinion, says: "Streptococcus erysipelatis (Fehleisen) cannot be distinguished by any properties morphologic, cultural, pathogenic, from streptococcus pyogenes, and practically all authorities in bacteriology consider the two identical. Attempts to subdivide into different species or varieties the various streptococci found in human beings in health and in disease, have met with little success. There is a wide range of variation, of course, in all properties, but none seem sufficiently constant to serve as a basis of classification. We must, I think, recognize that a given streptococcus, at least for the time being, is endowed with certain biologic qualities which render it capable of producing effects which another streptococcus may not be able to produce, but such biologic differences are either too inconstant or beyond our control or methods of study to enable us to base species characters upon them."

Having determined the status of the infectious organism, let us inquire as to its normal habitat and the probable circumstances under which it invades and produces disease in the tissues of the body of man.

We know the normal habitat of the typhoid bacillus and the means by which it gains access to the body; we know the normal habitat of the bacillus of tetanus and how it gains entrance to its unwilling human host, and we are now in a position to declare that we know the normal habitat of the streptococcus and how, under certain circumstances, it can virulently attack and produce disease in man.

The nose, the antra of Highmore, the ethmoid cells, the sphenoid cell or cells, the frontal sinus or sinuses, the Eustachian tube, the middle ear and the mastoid antrum, present a continuous surface of mucous membrane of fairly identical

structure in all its parts, moistened physiologically by a more or less abundant mucous secretion and directly continuous by way of the nasopharynx with the pharynx, the tonsillar region and the mouth.

Lewis and Turner (50), of Edinburgh, published in 1905 a bacteriologic study of the nose and its accessory cavities and I have availed myself freely of their work for the reason that they have reviewed all of the previous literature and have, by their own labors, practically brought the subject down to date.

Thompson and Hewlett (36) in 1895 had examined ninety-one cover glass smears from nasal mucus and nasal mucous membrane and had found eighty per cent of those from the interior of the nose sterile. The vestibule was never sterile.

The work of subsequent observers, however, cast doubt upon these results. Klemperer, and Park and Wright (37) determined that the interior of the healthy nose is not free from germs and that the nasal secretion has no bactericidal action. They found only six cases sterile out of thirty-six specimens taken. Hasslauer (38) in an examination of 186 specimens from 111 nasal cavities found the *Staphylococcus pyogenes albus* in twenty-five per cent, the pneumococcus in 20 per cent, the streptococcus pyogenes in seventeen per cent, and the pseudo-diphtheria bacillus in thirteen per cent. Viollet (39) also found staphylococci, streptococci and pneumococci in normal nasal secretion. Finally Lewis and Turner endeavored to eliminate the sources of error encountered by their predecessors and undertook and published this most valuable and conclusive series of observations on the healthy and the inflamed nose, mouth and accessory nasal cavities.

They took twenty-six specimens from sixteen healthy noses, and of these only three were found sterile. Thirteen specimens from seven persons were mono-organismal. Nine from seven persons showed two varieties of bacteria. One specimen showed three varieties. The pneumococcus was found in four cases, staphylococci in thirteen, streptococci in six, Hoffman's bacillus in two, bacillus aureus in two, bacillus mesentericus in two, spirillum in two, bacillus of Friedlander, the proteus vulgaris and unknown bacillus in one each. Organisms from nine healthy noses were non-pathogenic on inoculation in animals. From two healthy noses pathogenic organisms were obtained.

From one of these the staphylococcus aureus and albus, produced local abscess in but were not fatal to guinea pigs. In the other case streptococcus pyogenes was present, the broth culture proving fatal to a rabbit in fourteen days after intra-peritoneal injection of 2 c. c. Slow growth on culture media makes it appear "that the interior of the normal nose may appear sterile, owing to the fact that organisms, though present, occur in such few numbers as to escape recognition by rapid methods. Further it appears that the staphylococci found in the healthy nose are often of low vitality and do not grow so readily in ordinary media as the same varieties derived from pus. . . . It happened more than once that broth in which a swab had been immersed and incubated for forty-eight hours showed no cloudiness or other sign of growth in the first twenty-four hours; on the second day, however, the broth either became cloudy throughout or remained clear, but with distinct sedimentary growth. . . . The inference is that the nose contained numerically few organisms or that the organisms present in the nose were of diminished vigor and were revived after a period in a suitable medium, such as broth."

It appears that the organisms of the healthy nose belong to the same varieties as those found in abnormal conditions, but that they differ from the flora of pathologic nasal membrane in actual numbers, in purity of culture, in vigor of growth and in pathogenicity.

In inflammatory conditions of the nasal cavities, the organisms present belong to very much the same varieties as those which may be found in the healthy cavities. . . . All the varieties present may not be pathogenic on injection into animals, but usually one variety is virulent in the early stages of the disease. . . . The pathogenicity is high at first and diminishes rapidly so that an organism isolated in the first few days of a nasal catarrh and then very fatal to guinea pigs, becomes later incapable of producing any pathogenic effect. . . . To produce nasal inflammation not only is the presence of pathogenic varieties necessary, but these varieties must be virulent, or if avirulent, must recover their virulence by the influence of other factors.

Thirteen specimens were examined from eight acute cases and one chronic case of purulent nasal catarrh.

The streptococcus pyogenes was present in six of the acute

and in the chronic case—various staphylococci were present in six cases and the pneumococcus in one case. Of the eight acute cases, pure cultures of staphylococci were obtained in two and in the remaining six the streptococcus was the probable exciting cause.

In the chronic case, both were found, but the streptococcus was probably the etiologic factor. From three of the cases virulent pathogenic organisms were obtained—twice the streptococcus and once the staphylococcus pyogenes citreus. The streptococci in these cases were so virulent as to prove fatal to guinea pigs in twenty-four hours. Ten days later the streptococcus isolated afresh from the discharge in one of these cases proved nonpathogenic.

The pathogenic bacteria of the mouth include many varieties which are found in suppuration of the antrum and other sinuses. The streptococcus pyogenes, the staphylococci, the pneumococcus, the *B. diphtheriae* and the *B. pyocyaneus* are all found at times in the mouth. In addition to the organisms specially associated with carious teeth—streptococcus brevis, *B. necrodentalis* and staphylococcus albus—any of the denizens of the mouth may, of course, be found on the outer surfaces, if not in the deeper layers of the carious matter.

Törne (44) has published the only observations on the bacteria of the healthy accessory sinuses. He examined thirty-six cadavera in which the maxillary and frontal sinuses were healthy. Twenty-two were examined within two and one-half hours after death and in all these the sinuses were found sterile. Of the remaining fourteen examined, from three to twenty-five hours post mortem, seven were sterile and seven contained bacteria. This suggests that the entrance of organisms occurs some hours after death.

The maxillary and frontal sinuses were sterile in twenty-nine of the thirty-six cadavera examined within twenty-five hours post mortem. Törne also examined twenty-six pathologic cavities in sixteen cadavera. Eleven cavities examined three hours post mortem showed catarrhal changes, but nine of these were sterile. Twelve cavities showed chronic purulent inflammation. There were present streptococci, micrococcus pyogenes aureus, pseudo-catarrhalis, tardiliquans, etc. Three cavities in acute cases examined one and one-fourth hours after death, all showed bacillus pneumoniae.

Pearce (45) found inflammatory changes in the maxillary

antrum of many cases of diphtheria, with Klebs-Loeffler bacilli present in nearly all.

In four cases of diphtheria, complicated with scarlet fever, pus was found in the antra in three and the organisms present were streptococci and staphylococci. In 102 post mortem examinations in which the accessory sinuses were examined, Kirkland and Stacey (46) found thirty-four cases of infection by microorganisms in which streptococci, staphylococci and pneumococci were found.

Herzfeld and Herman (47) in ten cases of antral suppuration found the streptococcus in eight cases and staphylococcus in seven.

Howard and Ingersoll (48), in an investigation as to the causes of inflammations of the accessory sinuses, concluded that these inflammations are due to the bacteria which are commonly present in the buccal and nasal cavities—in the former in health and in the latter occasionally in health and usually in disease. These organisms are the diplococcus lanceolatus, streptococcus, staphylococcus pyogenes, *B. diphtheriae* and *B. influenzae*.

Stanculeanu and Baup (49) determined that, clinically and bacteriologically, there are two varieties of empyema of the facial sinuses, one with fetid pus following on dental affections (14) and the other of nasal origin with non-fetid pus—the latter being due to such organisms as the streptococcus and the pneumococcus. The greater frequency of anaerobic organisms in the mouth lends some support to these views. As to pathogenicity, they state that in cases of nasal origin the aerobes, and in cases of dental origin the anaerobes, are always found virulent on injection into animals.

Finally, Lewis and Turner themselves report on their extensive series of observations. They examined eighty specimens of pus from fifty-seven antral cavities. They found streptococci in 43 or 75.4 per cent, pneumococci in 42 or 74.1 per cent, and staphylococci in 40 or 70.1 per cent. Swabs were taken from the nasal chambers of forty-two of these cases. Pneumococci were found in twenty-nine, or 70 per cent, staphylococci in twenty-eight, or 66.6 per cent and streptococci in twenty-seven, or 64.3 per cent. Swabs were taken directly from the antral cavities in twenty-seven of the cases. Pneumococci were found in twenty-one, or 77 per cent, staphylococci in twenty-one, or 77 per cent, and streptococci in twenty-one, or 77 per cent. Of the forty-seven cavities, there were

only four in which the swab yielded an absolutely pure culture. In two, the streptococcus, in one the staphylococcus, and in one the pneumococcus.

Thirteen acute cases showed staphylococci in eleven, or 84.6 per cent; pneumococci in eleven or 84.6 per cent, and streptococci in eight, or 61.6 per cent. Forty-four chronic cases showed streptococci in thirty-five, or 80 per cent; pneumococci in thirty-one, or 70 per cent, and staphylococci in twenty-nine, or 66 per cent. The B. influenza, which was only obtained in one instance, occurred in a recent case of only three weeks' duration.

The authors state: "Though in the wealth of organisms associated in these cases, and possibly pathogenic, it could not be certainly stated which was the *fons et origo mali*, yet in some of the cases we were enabled to conjecture which organism was most probably responsible. This we did on consideration (1) of the pathogenicity of the organism (as ascertained by experiments on animals) and (2) of the organisms in direct swab as compared with nasal swab from the same case, and (3) of the persistence in chronic cases of particular varieties, and (4) of the occurrence in pure culture of one organism. In this way we are able, though with some diffidence, to assign the principal role to the pneumococcus in fourteen, to the streptococcus pyogenes in nineteen and to the staphylococcus in six of the fifty-seven cavities."

Among the recent cases, the pneumococcus was probably responsible for the inflammation in four, the staphylococcus in three, and the streptococcus in two—four cases being undeterminable. Among the long-standing cases, the pneumococcus was probably responsible in ten, the staphylococcus in three and the streptococcus in seventeen—fourteen being undeterminable.

In twelve cases, the antral disease was complicated by inflammation of the ethmoid in four cases, by disease of the frontal sinuses in six cases, and by disease of both ethmoid and frontal in two cases. Ten cavities showed staphylococci, seven showed streptococci and seven pneumococci. Pus from a chronic inflammation of the ethmoid sinus alone showed both streptococci and staphylococci. Pus from the frontal sinus alone showed in one case pneumococcus and staphylococcus, and in another case streptococcus and staphylococcus, and in a third case all three organisms.

In order to ascertain whether the combinations of organisms present might be pathogenic, even though the individual organisms in pure culture were not so, several injections of impure cultures were made. The results yielded no evidence that organisms, which in pure culture were non-pathogenic, would in combination give rise to disease. The reverse was, however, not the case, for in three instances a pneumococcus, which in pure culture was pathogenic, produced no illness when injected along with the other organisms present in the same case. Pneumococci, tested in ten acute cases, were pathogenic to rabbits in five, or 50 per cent. Staphylococci, tested in ten acute cases, were pathogenic to guinea pigs in five, or 50 per cent, and streptococci, tested in eight acute cases, were pathogenic in six, or 75 per cent.

Pneumococci, tested in seventeen chronic cases, were pathogenic to rabbits in five, or 29 per cent. Staphylococci, tested in twenty-eight chronic cases, were pathogenic in nine, or 32 per cent. In four cases in which the condition had lasted more than eight years, streptococci were found pathogenic to animals, but not fatal.

"In recent cases the organisms are pathogenic twice as often as in chronic cases." "In both recent and chronic cases, the streptococci are more pathogenic to animals than all other varieties." "The streptococci are almost always pathogenic when recovered from recent cases, but in chronic cases seem to have largely lost their virulent characters. There is no guarantee, however, that these organisms would remain so little virulent if by chance implanted on more suitable soil."

Iglauer (73) of Cincinnati, working in the Pathological Institute of Vienna, and taking nasal mucus directly from the posterior nares by means of a head section as soon post mortem as practicable, found, in twenty selected cases, the staphylococcus pyogenes aureus in eleven cases, the staphylococcus pyogenes albus in six cases, the diplococcus pneumoniae in eight cases and the streptococcus pyogenes in six cases. In fourteen additional cases in which there was a marked pulmonic lesion, he found the staphylococcus pyogenes aureus in seven cases, the staphylococcus pyogenes albus in eight cases, the diplococcus pneumoniae in eight cases and the streptococcus in six cases. Finally, as a negative contribution to the etiology of diseases of the maxillary antrum, the only one of the accessory cavities suspected of having any other than a nasal source for

the inflammations that attack it, I would quote Fletcher (70), who examined the 200 antra of 100 skulls for (1) abscessed teeth, (2) septa, (3) for conical protrusions of the roots of the teeth into the antrum, (4) for perforation by the roots of the teeth without protrusion and (5) for perforation of the antrum from ulcerated teeth. He says: "As to the molars, ulceration was found in more than 25 per cent of the skulls, there being in these 200 examinations fifty-seven ulcerated teeth, and out of these fifty-seven possible cases of perforation by inflammation and its results, we found such to be the case only four times, all other cases having perforated the alveolar border and discharged the pus into the mouth, two of them discharging both in the mouth and in the antrum." Lewis and Turner cite a number of observers to the same effect.

It is quite possible for bacteria to enter the middle ear and they probably do so, through the Eustachian tube, remaining dormant under normal conditions and eventually losing their vitality. In scarlet fever and other severe anginas, the micro-organisms effect an indirect invasion by way of the lymphatics—and in other diseases, such as endocarditis and diphtheria, by way of the blood vessels. Politzer (74) says that entrance may be effected from the external auditory canal through either the perforated or intact membrana tympani. Zaufal and Nadoleczy, quoted by Politzer, state that the streptococcus pyogenes and diplococcus pneumoniae are the exciting causes of acute otitis media. If the middle ear secretion is examined immediately after a paracentesis diplococci and streptococci occur just as often alone as in combination with other pathogenic micro-organisms. Except in the case of such specific diseases as diphtheria, typhoid, influenza and epidemic cerebro-spinal meningitis, where the specific micro-organisms of these diseases are found, the finding of micro-organisms in the discharge other than the pneumococcus or the streptococcus indicated a secondary infection.

Lermoyez and Helme (82) came to the conclusion from innumerable investigations that otitis media acuta is always of **mono-bacillic origin** and that the pneumococcus or streptococcus is seldom found in combination with other organisms. Secondary infection by the staphylococcus takes place only in the later course of the disease, per tubam or through the external auditory canal.

Before quitting the subject of the bacteriology of the

nose, the sinuses and the ear, I wish to call your attention to two significant observations. One was made by Dench and Cunningham (75) and reported to the American Otological Society in 1902 in a paper on "The Value of Bacteriological Examination of the Discharge in Acute Otitis Media as Determining the Necessity of Operative Interference." They say: "The presence of the pneumococcus as the sole etiologic factor signifies a rather mild form of inflammation in the mastoid cells. . . . On the other hand, it has been most interesting to note the rapidity with which the streptococcus infection develops. . . . The osseous structures have been found at the time of operation to be extensively involved, even in those cases which have been operated upon in the very earliest stages of the disease. In many cases in which the inflammatory process had existed but from forty-eight to seventy-two hours, extensive destruction of the bone had taken place." In four recent cases of streptococcus infection which had apparently cleared up, the patients returned complaining of a recurrence of the local pain with a slight discharge from the ear and an appearance of general sepsis and in these cases, upon operation, a most extensive destruction of the bony tissue was found. In three cases epidural abscess had been present and in a fourth case thrombosis of the lateral sinus existed at the time of operation.

The following tables, which require no explanation, are given:

Nature of Infection	No. Cases	Ice Coil	Operation	No Operation
Streptococcus (pure).	33	17	28	5
Staphylococcus.	3	3	2	1
Pneumococcus.	21	21	2	19
Mixed infection with streptococcus present.	25	19	23	2
Mixed infection with no streptococcus present.	9	9	3	6

Recovery.

	Ice Coil.	Operation.
Streptococcus.	14%	86%
Staphylococcus.	33 1/3%	66 2/3%
Pneumococcus.	90%	10%
Mixed with streptococcus.	8%	92%
Mixed no streptococcus.	66 2/3%	33 1/3%

The other significant observation is from the pathologic laboratory of the Ancon Hospital, Isthmus of Panama. Darling (56) writes: "This communication contains some of the results of an investigation which is being conducted to determine the relation of inflammation of the accessory nasal sinuses to pneumococcus infections. . . . The accessory sinuses have been examined with regard to this point in fifty-two autopsies, twenty-seven of which were pneumococcus infections, as follows: Lobar pneumonia, 22; acute pericarditis, 1; acute meningitis, 9; pneumococcus septicemia, 5. The remaining cases were controls.

It has been found that 92 per cent of all pneumococcus infections coming to autopsy show in a very marked degree more or less typical pneumococcus inflammation of one or more of the accessory nasal sinuses. The inflammation is generally intense. It is fibrinopurulent in character—fibrin and mononuclear cells being abundant. Pneumococci are always present and in numbers depending on the duration of the process. A point of great importance is the age of the sinus affection, which has been appreciably greater than that of the lung or meningeal lesion. Ninety-one per cent of the lobar pneumonia cases showed a sinusitis. All cases of acute pneumococcus meningitis presented an inflammation of one or more of the sinuses and in every one the middle ears and mastoid cells were normal. In the pneumococcus septicemia group, 80 per cent were found to be associated with a sinusitis."

Is it not possible for us now to assign their proper pathogenic role to the two principal pathogenic bacteria which have their normal habitat in the nose and its accessory sinuses—the pneumococcus producing such a disease as lobar pneumonia, acute purulent cerebro-spinal meningitis (pneumococcus), endocarditis, pericarditis and mild infections of the middle ear—while the streptococcus produces—starting, as it does, from the same base—violent inflammations of the ear—purulent meningitis, cerebral abscess, metastatic abscesses of various kinds, and, as I shall now proceed to show, erysipelas.

As is almost invariably the case with any material advance in our knowledge of the physical and biologic sciences, it happens that a number of pathologists in different countries have made approximately the same suggestion, at about the same time, but either because their theories were advanced through some medium that had but a limited circulation in a language not generally read, or because their papers did not fall

under the notice of systematic students of and writers upon pathology, or because the amount of evidence they could produce at the time was not sufficiently convincing—it is that up to the present their work has attracted but little if any attention.

H. M. Fish quotes Riberi as having in 1845, traced two cases of orbital abscess to a sinusitis, and as having said: "Intraorbital abscesses, observed at times after facial erysipelas, are not the result of the erysipelas, but, on the contrary, they are the cause or place of departure"—and quotes Zucarini as saying in 1853—"The increased secretion of mucus within the sinuses, when drainage is insufficient, soon changes to a mucopurulent form; its resorption induces erysipelas, and the appearance, increase and subsidence of the erysipelas depends entirely upon a successful drainage of the cavities." In 1891 Luc (14) reported the following significant case—"Following upon an erysipelas of the face which had already manifested its suppurative tendency by occasioning, in the course of its evolution, an abscess of the lid, the symptoms of an empyema of the left antrum of Highmore appeared. Only after 9 months was this empyema recognized and operated upon and an examination of the pus revealed the exclusive presence of the chains of streptococci characteristic of erysipelas Some days after the double operation (removal of polypous masses from the middle meatus and opening the antrum from the mouth) and without having been, at least apparently, submitted to any contagious influence, but after several excursions through intense cold, the patient was attacked by a facial erysipelas which began at the left nostril." Previous to seeing this case Luc believed that all empyemata of the antrum of Highmore were of dental origin. His earlier cases he believed could all be traced to dental caries; the pus from the cavities contained many varieties of organisms and it was invariably fetid. In this erysipelatous case, however, Dr. Ledoux Lebard found streptococci in pure culture in the antrum (the teeth of the patient were sound) while in another antral case operated upon at the same time by Luc, the origin of which was undoubtedly dental and in which the pus was malodorous, Lebard found staphylococci, diplococci, long filaments of short, round, oval or rod-like segments and isolated bacilli and micrococci. In 1896 a Swedish author, C. Janson (51), in a remarkable article on "Causes of Infection in Facial Erysipelas" (*Förhandlingar vid Första Nordiska Kongressen*,

August, 1896), first formulated the correct theory of the etiology of the disease without, however, adducing any cases in proof of his contention, which may be the reason why the paper has attracted so little attention. I translate a few paragraphs as follows: "It must strike one as remarkable that facial erysipelas is so much more frequent than all other forms of erysipelas. The constant exposure of the face cannot be the only reason, because the hands are equally exposed and much more frequently come in direct contact with substances that might cause infection—yet erysipelas of the hands is relatively a rare occurrence. Facial erysipelas generally begins at the nose, and fissures at the entrance of the nares have long been regarded as the points of entrance of the infection. Two symptoms are found in this disease that are frequently overlooked although they very often usher in the erysipelas—viz., nasal catarrh and inflammations of the pharynx. When we consider this it is rational to assume that the cause of the infection in erysipelas has its origin in the nose and pharynx.

It has been demonstrated that streptococci can always be found in the pharynx of a healthy person, and they could—even if under ordinary conditions they are non-virulent—assume an activity that would develop erysipelas or a fatal septicemia. . . . The author believes that in general the streptococci, which are harmless saprophytes in the pharynx under certain as yet not well understood conditions, can cause facial erysipelas with or without angina or coryza as a primary cause and that the infection usually develops in this manner. Streptococci then come to belong to the same group as the pneumococci and colon bacilli—viz., saprophytes with facultative virulence."

Six months later Mermet (11) in discussing palpebral erysipelas brought forward considerations of almost equal theoretical significance. He pointed out "that the streptococcus is not an habitual inhabitant of the skin, that we have not been able to find it on the normal lids and that Achalme has not been able to obtain cultures exposed freely to the air even in wards affected with erysipelas—note finally that the absence of predisposition of this affection for the lids of the right side seems to preclude the idea of a contamination by the hands of the patient. . . . Very frequently the streptococcus infection of the lids is secondary either to an external erysipelas or to an affection of the lachrymal sac and canal,

of the conjunctiva or of the cavities of the face. . . . We should point out here a fact of the greatest importance: it is the predilection that the streptococcus has to travel by way of the lymphatics and the subcutaneous tissue, evincing a preference for the ascending channels of the mucous membranes. This observation accounts to us for the predominance of streptococcic lid lesions considering the conjunctival determinations in the cases of palpebral erysipelas consecutive to infections of the sac or the upper lachrymal canal." In discussing recurrent erysipelas Mermet observes "one can very easily conceive that the streptococci, which normally inhabit the mouth, the nasal fossae and the lachrymal ducts in the quality of inoffensive guests recover their virulence under some influences analogous to those which experimentation has realized and invade the lids."

H. Roger (69) also, after a personal study of 957 cases says:—"Classic authors consider an erysipelatous angina as very frequent; our observations on this point do not accord with this opinion. Very often, it is true, the patients complain of having suffered with sore throat, but the objective examination was entirely negative and a close inquiry indicated to us that it was a matter in reality of painful swelling of the cervical glands. Adenitis frequently accompanies erysipelas. In 21 cases it has preceded by at least one day the cutaneous eruption. The nasal fossae, we believe, ought to be suspected more often than the pharynx; in many cases the patients were suffering with coryza for a greater or less time and the infection seems to have invaded the skin by way of an ulceration of the mucous membrane at the nasal vestibule." He refers also to the fact that streptococci spread anteriorly upon the skin may penetrate the cutaneous glands and there develop into inflammatory activity upon the occasion of an intercurrent cause such as a chill. A. Logan Turner also adds a definite expression of opinion in his recent work on *The Accessory Sinuses of the Nose*. He says: "Suppuration has been ascribed by Weichselbaum to an attack of facial erysipelas; it is more reasonable when these conditions are associated to regard the erysipelas as secondary to the nasal discharge."

The French authors and teachers seem to have appreciated the causal conditions of facial erysipelas for a number of years past. Thus we find in a thesis for the doctorate at

Bordeaux by Fauveau the following most excellent description: "In medical erysipelas" (spontaneous, idiopathic) "the port of entry of the contagion frequently passes unperceived, when the site of the disease is the face, because it is hidden in the natural cavities such as the mouth, the pharynx, the external auditory canal or the nasal fossae. . . . It is frequently by way of the nasal mucous membrane that the facial erysipelas that is called spontaneous or recurrent erysipelas arises. The pharynx is also one of the seats of predilection of erysipelas of the mucous membranes. From there it extends itself easily, thanks to the laxity of the tissues of this region and their abundant blood supply to the whole vault of the pharynx with all its anfractuosités, to the veil of the palate, to the buccal mucosa and to the nasal fossae. This spread of the streptococcic infection is important from the view point of the explanation of the ocular complications which it is able to provoke. Almost always, indeed, it is observed that an erysipelas occurring or beginning in the nasal fossa shows itself without by emerging either through the anterior orifice of the nose, or, and this is the condition which interests us particularly, by the orifice of the lachrymal canal at the internal angle of the eye. In the article on Erysipelas in the Dictionary of Jaccoud, Maurice Reynaud expresses himself thus—'I am brought to believe that the greatest number of cases of erysipelas of which the first manifestation appears as a red patch at the root of the nose have in reality emerged from one of the lachrymal points and have taken their origin in the corresponding nasal fossa.' It is indeed this manifestation on the part of the lachrymal channels that indicates the nature of the rhinitis of which one has only observed the external manifestation. It is in fact often difficult to establish the diagnosis between erysipelas limited to the nasal mucosa and certain intense coryzas—especially those whose general symptoms present in a majority of cases an unwonted severity and in which the temperature is quite elevated."

Following upon this theoretical discussion and the quotation of the views of men of wide experience and keen observation allow me to cite concrete instances where facial erysipelas took its origin in or from the nose, the accessory nasal cavities or the ear.

Mercier—Bellevue (81) in commenting on a case of facial Erysipelas occurring in the course of and due to a sinusitis of

the maxillary antrum and frontal sinus says: "The interesting point in this observation appears to me to reside in the etiology, or better, the pathogeny of this case of facial erysipelas occurring abruptly in a man appearing to enjoy excellent health. As I said in my opening remarks, the complications of sinusitis are as numerous as they are frequent; so, on the one hand, one finds on the part of the sinus the explanation of those gastro-intestinal or pulmonary affections which are so rebellious to all our remedial measures, and on the other hand, in a chronic or acute suppuration of a cavity of the face one can find the explanation of those cases of recurrent erysipelas which one combats so vigorously but which one cures so rarely because one does not know the real cause of them." In the course of the discussion M. Bessonnet said that he had seen erysipelas follow simple acute coryzas..

H. Roger (69) made personal observation of 957 cases of erysipelas. He divides them, after the classic authors, into traumatic and nontraumatic—i. e., into those in which an antecedent wound was visible and those in which no wound or abrasion was visible. Their distribution was as follows:

	No. of Cases	Nontraumatic		Traumatic		Total	
		M	F	M	F	M	F
Face.	469	183	219	35	32	218	251
Face and Neck.	96	24	53	15	4	39	57
Lower Limbs.	19	3	4	6	6	9	10
Upper Limbs.	9	2	1	4	2	6	3
Trunk.	4	2	1	2	2	2	2
	597	214	278	62	46	274	322

Nontraumatic—492.

Traumatic—108.

In 488 cases of facial erysipelas the distribution was as follows:

Cheek.	112	Scalp.	24
Internal angle of eye.	95	Forehead.	17
Base of the nose.	83	Upper lid.	12
Lids.	50	Temple.	9
Wings of nose.	41	Top of nose.	4
Ears.	36	Neck.	2
Chin.	3		

Spohn (77) collected by circular letter the details of 1,000 cases of erysipelas. Nine hundred were facial—of the facial the beginning point of the disease was—Scalp 3, Cheek 3, Lids

7, Ears 60, Lips 90, Nose 737. Eighty-two per cent began at the nose.

Spohn concludes "a careful examination will reveal that all or nearly all cases of facial erysipelas unless traumatic, had a previous chronic catarrh and a partial or total stenosis of one of the nostrils."

Welty (78) of San Francisco made a personal examination of some 60 cases of facial erysipelas which he reported to the Americal Medical Association. Unfortunately his records were destroyed by the earthquake and fire of 1906. He reports from memory. Eight patients had more than one attack and pus (in the nose) was always demonstrated in their cases. The point of inoculation in a large majority of cases was about the nose. More than 90 per cent complained of nasal affections accompanied with a discharge. In 60 per cent of the whole number of cases he demonstrated pus in the ear or nose. The bacteriologic examination of 30 cases of erysipelas demonstrated streptococci alone.

Examination of secretions from ear and nose showed mixed infections—streptococci always present. In the discussion that followed Farlow of Boston reported the following cases: Man of 40. Recurrent erysipelas. After treatment of an erosion of the septum no further attacks of erysipelas.

Patient aged 50—recurrent erysipelas. Treatment of an erosion of the septum prevented further attacks. Woman aged 40—recurrent erysipelas. Treatment of septal erosion prevented further attacks. Woman aged 84—Facial erysipelas. T. 103 and a tendency to coma. Farlow washed out the nose, treated a septal erosion and the next day the temperature was nearly normal. Dr. Mosher of Boston said that a routine examination of the nose in cases of erysipelas had been the custom at the Massachusetts General Hospital for years. The dermatologists always send their erysipelas patients to the Eye and Ear Infirmary for examination of the nose.

Stein (79) reports a case of chronic nasal catarrh; acute exacerbation. Neuralgic pain right side of head—Occlusion right nostril. T. 105 F. Rhinitis—Sinusitis—"Streptococci present in profusion." On the third day "a small area of redness made its appearance over the bridge of the nose, etc." Erysipelas. Examination of vesicles and pustules showed streptococci.

In cases of erysipelas with prodromal fever, as occurred 28

times in 69 cases, there is frequently an antecedent affection of the throat. The erysipelas spreads to the skin of the face through the nasal passages, the lachrymal canal or through the Eustachian tube and the external auditory canal. "Physiologic wounds"—clefts—are present in the mucous membrane covering the lymphoid tissue. Gerhard, Berlin. *Klinische Wochenschrift*—No. 3. s. 45-1887.

Clinical observations on a mild case of erysipelas which developed from a chronic scrofulous rhinitis. Arnaldo Cantini, *Bollet delle Cliniche* No. 2-188.

Three cases of chronic antral disease which had annually passed through one or two attacks of facial erysipelas for the preceding five years. After operative interference upon the antral contents, erysipelas did not recur.—Hajek *Pathol. u. Therap. der Entzünd Erkrank der Nebenhöhlen der Nase*, 1899, p. 77.

Cases of erysipelas of the pharyngeal mucosa are rare, but they are of great moment, as a secondary facial erysipelas may follow on a primary erysipelas of mucosa of the nose, throat and mouth. A case of this kind occurred in Schwartz's ear clinic. A patient who had had a tonsil removed visited another patient with erysipelas and thus acquired an erysipelas of the nasopharynx which spread through the Eustachian tube into the middle ear, the external canal, the auricle and the face.

Rendu saw a man with specific glossitis in whom he identified erysipelas by bacteriological examination. The erysipelas spread to the face. *France medicale*, 1892.

Erysipelas of the mucous membrane of the nose either begins in the pharynx, extends through the nose and then spreads over the face or it progresses in the opposite direction.—Die Krankheiten der Nase, Ihre Nebenhöhlen und des Nasenrachenraumes—Zarniko—Chap. 8 Rhinitis purulenta acuta—p. 166, P. 472.

Clergyman aged 48. Boil in the nose. Opened after 7 days. T. 103 F., P. 110. "Swelling and redness of the nose was marked and decidedly erysipelatous in character." Disease pursued a typical course except that there was some involvement of the posterior nares and the pharynx, and later more or less hemorrhage from the bowels for a week.—J. M. Harwood, Shelbyville, Ky. *American Pract. and News*, April 30th, 1887.

Case I.—Child aged 4. Acute nasal catarrh and facial ery-

sipelas commencing on the bridge of the nose. Warm alkaline nasal injections without any other treatment markedly improved the nasal condition and the erysipelas.

Case II.—Boy aged 12. Hypertrophic nasal catarrh. Recurrent attacks of erysipelas of nose and cheeks. Treatment of the nose caused the permanent disappearance of the erysipelas.

The reporter also says he has notes of two similar cases of his own and four of his colleagues. "In the cases referred to above the erysipelas always commenced on the bridge of the nose and was greatest on the side of the greatest pressure. There was no condition present in the nasal chambers that I could recognize as of an erysipelatous nature in any of them."—Geo. W. Major, Montreal, Can. *N. Y. Med. Jour.*, Aug. 10th, 1889.

A mechanic, 25 years of age, developed erysipelas on the left side of his face after a cold. (See also list of ocular complications after erysipelas.)—Leber, *Archiv. f. Ophth.*, Vol. xxvi, Part 3, p. 224.

With symptoms of a pharyngitis and inflammation of the upper passages, pains in the chest and difficulty in swallowing, a woman of 30 entered the hospital; here fever and delirium were added. In 9 days a facial erysipelas began at the nose. In a few days it disappeared without recurrence. (See also list ocular complications after erysipelas.)—Duroziez, *Archiv. de Med.*, 5 sec. Txv, s. 698.

Case I.—Man aged 29. Pharyngitis and slight earache. Post-pharyngeal abscess. Incised liberally; three or four grams pus. Pharyngeal tonsil removed. Two weeks later, acute otitis media. Paracentesis M. T. releasing bloody pus. Walls of pharynx greatly tumified and of a dusky red. The left nasal cavity swelled shut, T. 103 F., and erysipelas now spread from nostril over entire face. Severe case. One relapse. Recovery.

Case II.—Woman aged 25. Facial erysipelas which had arisen at the right nostril spread over the face and disappeared. The nasal passages were swollen and the pharynx reddened. There had been sore throat for some months; ear trouble had appeared one week previously, the M. T. bursting spontaneously. Mastoid tender. T. 103, P. rapid and feeble. A few days later erysipelas appeared again at the tip of the nose and spread over the face.—H. V. Wurdemann, *Medical News*, Nov. 21st, 1891.

Gasser reports: Erysipelas about the left orbit. On fourth day a flow of mucus from nostril, pain in temporal region, death on sixth day. Ethmoiditis found at autopsy. Quoted by Fish, *Am. Journ. Surgery*, Sept., 1906.

Vacher (83) of Orleans reported to the Société belge d'otologie a case of facial erysipelas in a woman which followed a paracentesis M. T. evacuating blood and pus in the course of a violent otitis and mastoiditis. She had suffered for a number of years from a chronic dacryocystitis in which the sac was daily emptied by pressure, the mucopurulent contents being expressed into the nose.

A woman of 38 developed facial erysipelas which, possibly originating in an excoriation at the right ala of the nose, followed a rapid cooling of the body. The lids swelled and both eyes protruded. (See also list of ocular complications after erysipelas.)—Jager, *Ophthalmoskop*. Handatlas, 1869.

Fig. 75—Plate xvl:

Man aged 35. Complained of exophthalmos and a discharge from the nose of one year's duration. Eye displaced down and out. Upper lid thickened and drooped, covering a soft swelling in upper part of orbit. Pressure on swelling caused thick pus to appear in left nasal passage. Ocular mobility restricted. Venous congestion of retina. Left middle turbinate hypertrophied. Middle meatus contained polypi and offensive pus. Probe detected extensive necrosis ethmoid cells. Patient excellent health. Futile attempts made to treat the case by intranasal operation, but disease was too extensive. Operation under ether. In completing external incision at inner orbital margin an abscess cavity was opened. Floor and inner wall of frontal sinus extensively diseased as also the ethmoid labyrinth. The sphenoidal sinus was healthy. Seventeen days after operation erysipelas appeared, lasting nine days. Recovery.—Arnold H. Knapp. *Archives of Ophthalmology*, Vol. XXVIII, p. 50.

Case I.—Contagion arising from abrasion in the anterior nares in a patient who was in the habit of picking the nose and who had visited and nursed an erysipelas patient in the neighborhood. Acute suppuration in the left middle ear occurring after extension of the erysipelas to the nose and throat. Recovery after one relapse. Microscopic examination of ear discharge revealed several forms of pus cocci including streptococci.

Case II.—Beginning in an abrasion of the m. m. of the lower lip in a pipe smoker, extending through the buccal cavity to the nasopharynx, through the Eustachian tubes to the middle ears, causing suppuration. Extension to face and scalp. No history of contagion. Recovery.

Case III.—A scrofulous child with erosion of anterior nares and upper lip from purulent rhinitis. Facial erysipelas. Recovery.

Case IV.—An old man, whose nasal passages had been occluded for years by an enormous number of polypi the operations for which were made daily for about a week. Considerable malodorous purulent discharge followed. After attempted disinfection, the galvano cautery was used and two days later erysipelas appeared in the nares extending over the face. Recovery.—H. V. Wurdemann, *Med. News*, Nov. 10th, 1894.

A working woman, 56 years of age, poorly nourished, who suffered with chronic rhinitis, developed facial erysipelas with involvement of the lids. (See also list of ocular complications after erysipelas.)—Mitvalsky, *Klin. Monatsbl. f. Augenheilk*, 1893—s. 18—Aschenborn, *Archiv. f. klin. Chirurg.*, XXV—s. 154.

A primipara, aged 33, complained of pain and sensation of tension in the nose on the day of delivery. She had suffered from nasopharyngeal catarrh in the last days of her pregnancy. Two days after delivery the nose and the lids of both eyes were so swollen that the eyes could not be opened. Violent erysipelas developed. (See also list of ocular complications of erysipelas.)—Joss. *Correspondenzbl. f. Schweizer Aerzte* Bd. XXXI—1901—s. 617.

Laborer, 37 years old. Considerable swelling of the tongue, which began at the anterior half at a point of ulceration, the result of a carious tooth. The swelling was so great that the patient could not close the mouth. There was debility, headache and fever. Violent erysipelas. In the course of a few days the pharynx and, in succession, the cheeks, the nares, the eyelids, the ears and the scalp became involved.—Garel, *Annales des. mal. de l'oreille*, May, 1891.

“Cauterization of the nasal mucous membrane is not entirely free from risk. Cases have been met with in which erysipelas of the nose and face, otitis media, ocular troubles, such as amblyopia and venous engorgement of the eye with

papillary hyperemia have occurred." . . . "In cases of recurrent erysipelas of the face the pharyngeal tonsil has apparently been the starting point of the erysipelas and it is well known that the nose, especially when affected with chronic rhinitis, frequently gives rise to facial erysipelas. These facts should emphasize the importance of the careful examination of the nose and nasopharynx in cases of recurrent erysipelas of the face and they would also suggest a possible mode of origin of pharyngeal and laryngeal erysipelas, because if the disease can spread externally there is no reason why it should not spread internally."—*Diseases of the Nose and Throat*, Hall and Tilly. Second Edition, 1901.

Facial erysipelas occurring in a case of melancholia. "The patient had a well defined facial erysipelas, beginning on the right side of the face just in front of the ear and in the external canal of the left ear, from which came a seropurulent discharge."—*Jour. Am. Medical Ass'n*, 1900, XLII, p. 647.

Woman, aged 70. Erysipelas of the face having begun at the nasal orifice on the right side, involving the right half of the nose and cheek. Throat red, tongue dry. (See also list of ocular complications after erysipelas.)—F. Terrien, *Neurite et atrophie optique au cours de l'erysipele*. *Progress Med.*, Paris, 1904, XX, p. 165.

In addition to the case mentioned in the discussion of Dr. Welty's paper at the meeting of the American Medical Association, Dr. John Farlow of Boston reports the following cases:

Case I.—Woman, aged 40, had had a number of severe attacks of facial erysipelas at frequent intervals. Marked erosion of the septum. Another attack of erysipelas threatened. Thorough cleansing of the nose caused the symptoms to disappear and she went nine years without another attack.

Man, 52 years, had a very severe attack of facial erysipelas. Nose examined later and marked septal erosion with bloody crusts found. On one occasion the nose became reddened, but treatment of the septum stopped what the patient feared would be another attack of facial erysipelas. In the discussion Dr. S. Johnston said he had seen one case of facial erysipelas having its origin apparently in a perforation of the nasal septum.—*Trans. 25th Ann. Meeting American Laryngological Assn.*, 1903.

In Welty's valuable article, besides recording his own experiences and referring to nine similar reports in the litera-

ture, he refers to the following presumably unpublished cases: "Dr. Able Johnson, San Francisco, has seen four cases of erysipelas in European clinics. In 2 he was able to demonstrate pus in the nose; 2 followed surgical interference, 1 for extensive removal of polypi accompanied by pus, 1 following the removal of the inferior turbinated in which pus was not demonstrated. Dr. Albert Houston, San Francisco, has seen 2 cases follow surgical operations on the nose for the removal of polypi. In the Vienna Nose and Throat Clinic I have seen 3 cases of erysipelas develop while the patients were under treatment. . . . I also observed 3 cases of erysipelas following mastoid operations, 1 in Halle and 2 in Vienna."—C. F. Welty, *Jour. American Med. Assn.*, Dec. 22nd, 1906.

Facial erysipelas being such an extremely common disease and the microbic cause of it having been so firmly established, individual cases of it are no longer reported in the literature unless for the purpose of noting some complications, such as meningitis, intestinal hemorrhage, orbital abscess or severe ocular complications.

So few have as yet recognized the local origin of the infection that it is only in the literature of rhinology that a distinct exposition of the predisposing and exciting causes may be found. Knowing, however, that a large amount of valuable data could be secured upon application to the proper sources of knowledge, I addressed a circular letter to the members of the American Laryngological Society, the American Otological Society, the American Academy of Ophthalmology and Oto-Laryngology and the American Ophthalmological Society.

This letter solicited replies to the following questions:

- A.—Have you had any cases of facial erysipelas (or erysipelas of other parts of the body) which you could consider as due to disease of the nose or its accessory sinuses?
- B.—Have you had any cases of erysipelas following upon operations performed upon the mastoid for either acute or chronic disease?
- C.—Following upon operations performed upon the nose for acute or chronic disease?
- D.—Following upon operations performed upon the antrum of Highmore for acute or chronic disease?
- E.—Following upon operations performed upon the ethmoid cells for acute or chronic disease?

F.—Following upon operations performed upon the sphenoid body for acute or chronic disease?

G.—Following upon operations performed upon the frontal sinus for acute or chronic disease?

H.—Have you had any cases in which more or less extensive damage was done to the eye as the result of an attack of facial erysipelas, and if so, could you trace the cause of the erysipelas in these cases? Did any of these cases have diseased nasal chambers or disease of the accessory cavities?

I have to extend my sincere thanks to the gentlemen of these societies for the very large number of synopses of extremely interesting cases which they have sent me. I appreciate the trouble they have taken and hope they will derive some satisfaction out of having helped to clear up a subject which does not appear to be entirely clear to some of our co-ordinate branches of medicine and surgery.

The answers, as I append them below, are lettered to correspond with the letters of the questions as given above for ease of reference.

Cases of erysipelas occurring in course of and due to disease of the nose or accessory sinuses, or following upon operations upon the ear, the nose or the accessory sinuses:—

J. F. Crouch, Baltimore. *A.*—One case due to infection of ethmoidal or frontal sinus. *B.*—One case. Acute mastoiditis. Operation. Erysipelas on third day. Recovery. *C.*—Two cases of excision of cartilage of septum. Erysipelas on second day. Recovery without effect on field of operation. *A.*—Man aged 53. Disease of ethmoidal sinus of right side; developed erysipelas of lids and orbit which on fifth day caused death, with symptoms of septic meningitis.

C. M. Reyher, Garrett, Ind. *B.*—Had the following personal experience: Tonsillitis, acute nasopharyngitis. Infection of the middle ears through Eustachian tubes by douching out of pharynx and nose. Acute otitis and mastoiditis right and left. Operation on both mastoids. Five days later erysipelas spreading over face, neck, chest, abdomen and back. Duration of erysipelas attack, 3 months. Operation wounds discharged for 5 months.

A. E. Prince, Springfield, Ill. *A.*—Four or five cases in conjunction with acute mastoid disease. *B.*—One case following operation for acute mastoid disease.

W. H. Haskins, New York. *B.*—Two cases following operation for acute mastoiditis. Recovery without sequelae. One doubtful case diagnosed erysipelas, but may have been a dermatitis following use of iodoform.

Herbert Harlan, Baltimore. *B.*—Woman aged 71 years, Erysipelas appeared fifth day after operation for acute mastoid disease. Desperately severe case for four or five weeks. Recovery.

Geo. F. Hawley, Chicago. *B.*—Operation for acute mastoiditis. Fistulous opening remained. Secondary operation performed. Notwithstanding all precautions in operation and after-treatment, erysipelas on third day. Had not been a case of erysipelas in hospital for six months and was first time patient suffered from disease. *C.*—Erysipelas following operation for fractured nose. Antiseptic precautions taken, but in vain. Infection may have taken place at time of fracture and laceration.

R. S. Lamb, Washington. *B.*—Woman aged 33. Operation for acute mastoid disease. Erysipelas developed on fourth day. Twelve days later wound reopened and necrotic tissue removed.

Randolph Brunson, Hot Springs, Ark. *A.*—Three cases of erysipelas having origin in suppuration of middle ear. One in acute suppuration, two in chronic suppuration. *A.*—In the course of a chronic suppuration from the nose, erysipelas developed and extended over one side of face, having its origin in nasal cavity. Duration a few days. *D.*—Same cases as above. Operation for draining suppurating antrum of Highmore through the canine fossa. Two weeks later erysipelas developed and traveled over same side of face. Duration a few days. *C.*—After operation on frontal sinus erysipelas developed, apparently from external wound, and patient subsequently died from meningitis during time erysipelas was at its height. Operation under bad surgical environment.

J. C. Easton, Springfield, O. *A.*—Facial erysipelas as the result of an abrasion near the inner canthus of right eye. Spread over lids, brow and right side of face. Acute rhinitis part of the time, but this was late in the disease. In a few days there was sloughing of tissue at initial point. Incision made, pus evacuated. On probing in region of ethmoid cells more seropurulent matter evacuated. (See also list of ocular complications after facial erysipelas.)

W. Sohler Bryant, New York. *A—Case I.*—A case of

purulent pansinusitis with facial erysipelas every year or two. It commenced on the alae nasi or on upper lip close to nasal orifices and spreads over the whole head. *Case II.*—Case of acute purulent rhinitis. The erysipelas commenced at the orifices of the nose and spread over cheeks and the whole head. *B.*—Has recently seen in consultation a severe case of erysipelas with temperature range 105 F.-106 F., and profound sepsis in a man, following a mastoid operation consequent to grip infection. Erysipelas commenced in pinna and spread to whole head, neck and back down to buttocks.

M. A. Hughes, Salt Lake City. *A.*—Man aged 45 years. Small ulcer in left nostril which he irritated with finger nail. Erysipelas of all accessory sinuses of left side of nose, ultimately involving eye and meninges of brain. Death from cerebral involvement on sixth day. Patient treated conjointly with the late Dr. J. McKenna.

H. S. Birkett, Montreal, Can. *A.*—*Case I.*—A girl, 10 years of age, suffering from atrophic rhinitis, developed a double acute suppurative frontal sinusitis, followed during the course of the inflammatory condition by an attack of acute erysipelas. It showed itself over the region of both frontal sinuses and extended upward to the middle of the scalp. Recovered under the use of antistreptococcus serum. *Case II.*—A man, aged 60 years. Erysipelas showed itself over the nasal bones and extended slightly on to both cheeks, due (in Birkett's opinion) to the abusive use of snuff. No recurrence of erysipelas since the discontinuance of the use of snuff.

N. McKitterich, Burlington, Ia. *C.*—Was called to see a supposed case of la grippe. Slight redness and swelling of lower portion of nose was present. Learned on inquiry of a cauterization of enlarged turbinal shortly before onset of illness. Diagnosis of erysipelas was confirmed by rapid spreading of disease and death on fifth day.

Kaspar Pischel, San Francisco. *A.*—One case facial erysipelas due to polypi of the nose. Cannot give synopsis of history, as records were burned.

John E. Weeks, New York. *A.*—Physician, aged 51, had a small ulcer on the septum nasi, right side, which was present more or less constantly for a number of years. Character unknown. Ulcer about two-thirds of the distance back from the anterior nares. Had three attacks of facial erysipelas, originating, according to the testimony of the patient, who was

a close observer, in this small superficial ulcer. Ulcer observed by Dr. Weeks from time to time.

H. H. Briggs, Asheville. *A.*—Male, aged 47. Otherwise healthy. Seen in consultation. Inflammation beginning in nostrils as if from an acute rhinitis. Spread all over face and ears and on to the scalp; also into the pharynx and Eustachian tubes and to the middle ear, the M. T. perforating. The head of patient was much swollen. The eyes escaped, although there was stenosis (temporarily) of the lachrymal duct. Not having seen patient before onset of disease, do not know if he had any previous accessory sinus involvement. *D.*—*E.*—*F.*—*G.*—Female, aged 44. Chronic empyema antrum of Highmore, sphenoidal sinus, anterior and posterior ethmoid cells and frontal sinus on left side. Ethmoid, sphenoid and antrum operated upon. Nasal duct enlarged into frontal sinus. Finally opening through frontal bone was made and sinus curetted. Patient went home and some weeks later had an erysipelas about the fistulous opening. Process was arrested by treatment.

L. C. Cline, Indianapolis. *B.*—Male, aged 26. Operation for chronic mastoid disease. Five days later erysipelas extending above and to the front, involving the eyelids and causing a superficial abscess above and in front of the ear. *D.*—Two cases after operation upon the antrum of Highmore. Recovery without complications.

W. H. Peters, Lafayette. *A.*—Fissures of the vestibule were present in two cases preceding the disease. *A.*—“J. T. S., embalmer, aged 31, came for an operation for deviation of septum. It was on Saturday. I postponed the operation until Tuesday. On Tuesday morning he came with a T. 103.6 F., and I referred him to his family physician. Erysipelas appeared within twenty-four hours, beginning on the side of the nose in which I was to have operated, covering the whole head, neck and front of the chest below the nipple line. There were abscesses of both tear sacs, of the antrum of Highmore on the occluded side, and extensive abscesses of the scalp. The patient recovered; but if I had operated at the appointed time, namely, on the day he consulted me (Saturday), no man living could have convinced me that the operation had not caused the erysipelas, though not necessarily through any fault of mine.”

W. H. Dudley, Los Angeles. *A.*—Has seen erysipelas occur

following throat inflammations and acute ear conditions. His records are not at present accessible to him.

H. O. Reik, Baltimore. *B.*—One case following acute otitis media suppurativa, beginning December 25th. Mastoiditis, with extensive subperiosteal abscess extending in front of auricle. Long neglect. Operation early in February. Three weeks later, returning for dressing, was found to have facial erysipelas. Serious illness followed. Cured by anti-streptococcus serum. Pneumococcus from ear and mastoid, *B.*—One case after tympano-mastoid exenteration. Like the first case it occurred weeks after the operation, but while dressings were still being made. Mild case.

Ford, ————. *A.*—One case of chronic suppurative otitis media gives a history of two attacks of erysipelas.

G. P. Head, Chicago. *A.*—Boy of 15. Very marked deviation of septum. Almost complete occlusion of one side. Had had a vestibulitis for some weeks. Erysipelas began at edge of right ala nasi and spread over right cheek and nose.

S. D. Risley, Philadelphia. *A.*—"One case following or possibly beginning in the right nostril of a patient with chronic rhinitis and an enlarged middle turbinate with much stuffing of the nostril. Came on like an acute coryza and rapidly developed into an attack of violent erysipelas, spreading to both sides of the face."

J. W. Ingalls, Brooklyn. *A.*—"Necrosis of septum. It is probable that there was involvement of the accessory cavities. (The case came under my care twenty years ago when but little attention was given to the accessory cavities.) In the course of six years she had three attacks of facial erysipelas."

L. R. Ryan, Galesburg. *B.*—*Case I.*—Sister of Charity, aged 30. Acute mastoiditis. Intense pain, moderate fever and swelling. Wilde's incision made. Immediate relief. Patient died in a few days from what the attending physician diagnosed as erysipelas. Ryan saw the case but once. *Case II.*—Woman of 70 years operated upon for senile cataract. Erysipelas developed within twenty-four hours, involving nose, cheeks and forehead. Cornea sloughed and eye was lost. Afterward discovered pus deep in duct, also some involvement of the ethmoid. Case was undoubtedly of nasal origin.

W. E. Casselberry, Chicago. *E.*—Girl, aged 20. Purulent bilateral nasal discharge, polypoid degeneration of both middle turbinals. Puncture and irrigation of antra negative. Frontal

probably negative. Thickening of nasal bridge. History of thirty attacks of facial erysipelas during the past six years, mostly commencing within the right naris and striking through the nasal bridge. All degrees of severity. Bilateral middle turbinectomy, ethmoidal cell curettage. Treatment incomplete, having been interrupted by attack of erysipelas. *A.*—Two cases facial erysipelas which commenced within the nostrils without any special or known antecedent nasal disease. *C.*—Man, aged 55. Sharp-forceps removal of a few polyp-buds from middle meatus, followed within a week by a severe facial erysipelas which commenced in that nostril. Not a pus case before or since, as several years elapsed without the development of any serious degree of ethmoidal or sinus disease. *C.*—Man, aged 40. A case similar to above, but exact details not remembered or recorded.

Unsigned communication from some member of the American Academy of Ophthalmology and Oto-Laryngology, the American Otological Society, or the American Ophthalmological Society. *A.*—Man, aged 63. Acute mastoiditis with erysipelas. Operation. Whole mastoid necrotic. Eruption spread over the whole body twice and half the body the third time. Patient comatose five days. Recovery. *B.*—Operation for acute mastoiditis. Woman, aged 39. Erysipelas commenced on lobe of opposite ear, covered half of head and shoulder, but did not involve the wound or the operated side of body. Recovery. *B.*—Girl of 17. Operation for acute mastoiditis. Erysipelas of opposite side of head. Recovery. *G.*—Case seen in hospital service of a colleague. Frontal sinus opened externally. In six to ten days erysipelas developed.

Hiram Woods, Baltimore. *B.*—*Case I.*—Child. Mastoiditis in course of scarlet fever. Operation followed by erysipelas starting from tragus. *Case II.*—Man, whole head involved third day after operation. *Case III.*—Erysipelas following incision of M. T. for acute otitis media. *Case IV.*—Erysipelas following removal of polypi from external auditory canal. *Case V.*—One case appearing six days after the radical operation for chronic mastoiditis.

Frank C. Todd, Minneapolis. *A.*—Hospital nurse, aged 25. Nov. 20th, 1906, was taken with a severe "cold" in the head characterized by profuse discharge from both nostrils, pain in frontal sinus and region of both antra; fever, general malaise. Dr. Todd called Nov. 24th. Diagnosis, acute sinusitis, frontal

and ethmoidal, with probable involvement of antra. Same day there became manifest erysipelatous eruption which later covered nose, region over frontal sinus and down on to the cheeks for a short distance. Severe attack. T. 105 $\frac{3}{5}$ F., P. 126. Possible history of previous sinus trouble. Case of Drs. Benjamin and Wright. Discharged cured Dec. 7th.

J. R. McIntosh, St. John, N. B. G.—“I have seen at least two cases of frontal sinus disease looked upon as erysipelatous by others. I regret, however, I could not agree with that opinion in these cases, considering it simply inflammatory and due to repeated subacute attacks of frontal sinus disease. . . . I also know of a friend of mine being treated for some high nasal trouble. Erysipelas followed and death resulted. In this case I know the operator (now also dead) had atrophic rhinitis.”

Chas. N. Cox, Brooklyn. D.—One case of erysipelas following operation for removal of sarcoma of antrum involving also nasal cavity, ethmoid cells and orbital plate. Recovery. Progress of malignant disease seemed to be stayed. Patient lived one and a half or two years and then died of recurrence.

Thos. J. Harris, New York. B.—Erysipelas following upon secondary operation for acute mastoid disease. Erysipelas mild. Did not retard healing or involve wound. D.—Operation upon antrum for disease induced by fibroma of nasopharynx. Erysipelas severe but did not extend beyond face. A.—Repeated attacks of facial erysipelas on side corresponding to diseased ethmoid. Mild in nature.

C. R. Holmes, Cincinnati. C.—Sister of Charity, aged 26. Erysipelas three days after turbinectomy. Patient had a severe chronic ethmoiditis and the operation was necessary to secure space in which to attack the ethmoid. Attack mild. A.—Man, aged 38. Involvement of all cavities on right side, chronic, with acute exacerbations. Operations upon inferior and middle turbinate, ethmoid, frontal and antrum. Mild attack of erysipelas during convalescence. B.—Woman, aged 25. After operation for chronic mastoiditis in which there was extensive destruction of bone. Erysipelas on thirteenth day. Case of average severity lasting two weeks. B.—Woman, aged 67. Operation for severe acute mastoiditis. In forty-eight hours erysipelas rapidly spreading forward from ear. Mild attack lasting three days. G.—Man, aged 46. History of alcoholic excesses. Pansinusitis R. & L. Chronic case with

frequent exacerbations of inflammation in frontals. External operation opening both frontal sinuses during acute attack. Erysipelas followed immediately. Severe attack, lasting two weeks. Corneal ulcer.

C. Barck, St. Louis. *B.*—One case. Emergency operation, without facilities for asepsis or antisepsis. Recovery.

W. Cheatham, Louisville, Ky. *A.*—Three cases, with occasional relapses attributed to small abrasions in the nose. Chronic nasal catarrh with excessive secretion and nasal engorgement.

O. A. Griffin, Ann Arbor. *A.*—Woman, aged 50. Deviation of septum. Enlarged middle turbinated-ethmoidal disease. Developed erysipelas in affected side of nose, which spread to face. Severe case. Recovery with more profuse discharge from nose.

Edw. J. Bernstein, Kalamazoo, Mich. *A.*—Man, aged 50. Good health. Empyema antrum of Highmore due to necrosed molar tooth. Erysipelas made its appearance at lachrymal sac and spread over face. Death in twelve days.

Thos. F. Keller, Toledo. *A.*—Patient, aged 67. Erysipelas following paraffin injection for saddle nose. Excessive hyperemia and dryness of m. m. nose. *A.*—Woman, aged 38. Recurrent erysipelas due to antral disease and rhinitis. Attacks have ceased since operation and cure of antrum.

Geo. F. Keiper, Lafayette. *B.*—Double operation for double mastoiditis. Both wounds infected. Recovery, but with little filling up of mastoid wounds.

Ray Connor, Detroit. *B.*—Girl, aged 11. Double mastoid operation six years previously. Chronic discharge since. Acute abscess. Radical operation done. Eleven days later, skin grafting. Four days later, erysipelas of five days' duration. *C.*—Girl, aged 18. Erysipelas following removal of tonsils and adenoids.

Wm. R. Dabney, Marietta. *A.*—Recurrent erysipelas in man due to chronic frontal, anterior ethmoid and bilateral maxillary antrum disease. Erysipelas always preceded by acute exacerbation of above chronic conditions. After cavity disease had yielded to treatment erysipelas did not recur during life of patient. 12 years. *A.*—One case facial erysipelas in a chronic antral suppuration. *B.*—Erysipelas following operation for acute mastoiditis in which the streptococcus was the organism present in the mastoid. Recovery.

W. F. Mittendorf, New York. *A.*—Has had two or three cases.

D. E. Esterley, Topeka. *B.*—Acute mastoiditis following diphtheria. Simple operation. In a few days erysipelas. Throat greatly inflamed from a secondary mixed infection. Nephritis. Death.

Edgar A. Forsyth, Buffalo. *A.*—Boy, 12 years. Chronic rhinitis. Erysipelas of nose and cheek after acute exacerbation of rhinitis.

F. Park Lewis, Buffalo. *B.*—Erysipelas following mastoidectomy for acute suppurative inflammation. Erysipelas was, at the time, in the hospital, but not in the ward containing this patient.

Wolff Freudenthal, New York. *A.*—One case seen in Germany. Recurrent erysipelas for twenty years due to atrophic rhinitis with crust formation. One or two attacks a year, sometimes severe. Has seen from three to six similar cases in New York. *E.*—"Doubtful case. Lady, 69 years of age, had the ethmoid cells scraped. Two days later she telephoned she had some fever. In spite of this she left for Europe the next day. The nose and part of the face was swollen and red. She died in mid-ocean." Dr. Freudenthal did not see her between date of operation and date of departure.

Horace M. Starkey, Rockford. *B.*—Boy of 15. Mastoid antrum and cells filled with pus. Lateral sinus and dura uncovered, but appeared normal. T. fell to nearly normal and patient did well for two days. Erysipelas supervened and quickly carried off patient by meningitis. Family lived on farm five miles from small town. No other case of erysipelas was known in the region. Dr. Starkey had not seen a case of erysipelas for two years, and his instruments had never been near a suspicious case.

Henry B. Hitz, Milwaukee. *B.*—Woman, 36 years. Acute mastoiditis secondary to influenza. Complete ablation of tip and zygomatic cells. Abscess cavity located in tip close to the junction of apophyses with squamous portion. It contained a pure culture of streptococci. Four days after operation erysipelas developed and extended over face, head, neck, back, to buttocks, and down left arm. Recovery. *D.*—One case, chronic. Antrum full of pus and caseous matter and necrotic polypi. Radical operation. Mild attack of erysipelas involving right side of face.

J. G. Dorsey, Wichita. *A*.—Two cases accompanying suppurative otitis media.

E. F. Reamer, Mitchell, S. D. *A*.—Woman of 35. "Coincident with an acute exacerbation of a chronic nasal catarrh."

E. A. Kegley, Cedar Rapids. *C*.—Chronic dacryocystitis R. & L. Successful operation on one sac and duct. Operation on other was followed on third day by erysipelas. Dr. Kegley lost sight of patient, but was informed she had corneal ulcers, which healed, leaving a useful eye.

U. B. G. Ewing, Richmond, Ind. *A*.—Woman had a severe coryza. Abrasions occurred from mopping nose with handkerchief. Erysipelas followed.

Otto J. Stein, Chicago. *A*.—Woman. Acute purulent rhinitis associated with an erysipelas that extended to both sides of the face.

A. J. Knapp, Evansville. *B*.—Female, aged 45. Acute otitis media suppurativa following tonsillitis. Spontaneous rupture. M. T. Mastoiditis. Streptococcus infection. Operation third day. Erysipelas at mastoid wound migrating over face, scalp, neck and shoulders. Recovery. *B*.—Female, aged 12. Case similar in every respect to the preceding one.

H. A. Beaudoux, Fargo, N. D. *C*.—Partial turbinectomy. Patient later fell off his bicycle and sustained a slight abrasion of bridge of nose. Erysipelas followed.

E. E. Foster, New Bedford, Mass. Operation for chronic purulent ethmoiditis. The second day after operation, swelling occurred on the side of the head operated upon, and temperature rose to 104, where it remained for 24 hours, when it rapidly disappeared, as did the swelling. Doubtful case.

J. A. Huizinga, Grand Rapids. *A*.—Attempt to dislodge a piece of dried mucus from the nose with a hairpin. Erysipelas followed. Severe case with meningeal irritation. *B*.—Erysipelas following mastoid operation. Original source of infection may have been external auditory canal before case was operated upon.

Ernest V. Buskman, Wilkesbarre. *B*.—Three days after a mastoid operation on the right side, erysipelas developed in the left ear and left side of face. The wound did not become infected.

F. Vinsonhaler, Little Rock. *A*.—One case originating in pustule in tip of nose. *B*.—One mild case two weeks after

operation. C.—One case following cauterization of inferior turbinate.

H. Gifford, Omaha. C.—Man. Sunken nose bridge. (History negative and symptoms of lachrymal obstruction on left side.) A large probe, No. 11 or 12, was passed directly from the tear sac into the nose with very little resistance. The inner wall of the lachrymal depression evidently was gone. This was immediately followed by a severe attack of erysipelas, spreading from the inner angle of the eye. When this was over the man had no further trouble with lachrymal obstruction. 10-12 years.

W. K. Rogers, Columbus, O. B.—Erysipelas developed about one week after an operation for mastoid empyema with septic sinus thrombosis, involving deep ligation of the internal jugular. The petrosal sinuses had also been infected and there developed a large retropharyngeal abscess. During convalescence a catarrhal appendicitis and pleurisy, with effusion, developed. C.—One case following simple tonsillotomy.

Chas. H. May, New York. B.—One case following operation for acute mastoiditis. Ward case in Mt. Sinai Hospital ten years ago. Details unobtainable. C.—Man. Alcoholic history. Chronic dacryocystitis. Exsection of lachrymal sac. Twenty-four to forty-eight hours later erysipelas developed, starting from the region of the wound. Meningeal symptoms and death. Mt. Sinai Hospital.

T. W. Moore, Huntington, W. Va. A.—One case following abrasion of the lip.

J. Leslie Davis, Philadelphia. A.—Two cases originating from an ulcerated lesion on anterior nasal septum. In both cases the patients had been picking at the irritated crusted spots, and with the facial swelling there was a coexistent acute swelling of the nasal mucous membrane which subsided with the clearing up of the facial symptoms.

Francis P. Emerson, Boston. A.—1901, September 12th, Mrs. C. H. S., aged 53. Left facial erysipelas subacute, 1902. October 2d, left facial erysipelas subacute. Distinct history of left supraorbital pain at intervals for two years becoming more frequent. Examination showed a polypus between left middle turbinal and outer wall. Spongy tissue about nasofacial duct and some crusting. Patient had used finger in naris. Removing polypus and opening and draining an ethmoidal cell cured the case. No recurrence of erysipelas in five years.

S. L. Ledbetter, Birmingham. *A.*—Two cases. Males, suffering from catarrhal conditions. Erysipelas started in nose, spread to face. In both cases perhaps infection from finger. Recovery. *A.*—One case. Male, aged 70. Erysipelas began in nose, spread to face, head, neck. Edema of glottis. Death. *A.*—One case. Female. Chronic ethmoiditis. Recurrent erysipelas. Ethmoid cells cleaned out. Erysipelas has not returned for one year. *C.*—Male, about 34 years. Septal operation by another physician. Erysipelas began in nasal orifice extending to face, scalp and chest. Recovery.

Edw. J. Brown, Minneapolis. *A.*—Mrs. W., aged 53 years. Erysipelas of forehead and cheek following right acute dacryocystitis. Nasal suppuration. *A.*—Fred C. S., 32 years. Erysipelas below right auricle following purulent inflammation in floor of external canal. Right middle turbinal degenerated and polypoid and sinus suppuration for years.

L. E. Maire, Detroit. *B.*—One case following operation for purulent mastoiditis. Recovery.

W. H. Merrill, Lawrence, Mass. *A.*—Erysipelas began on inner margin left lower lid after phlegmonous inflammation of left nostril had existed two days. *A.*—Two cases where infection began in nasal vestibule. End of nose and nasal mucous membrane involved and in forty-eight hours empyema of the antrum of Highmore. *B.*—Three cases. Acute streptococcus infection of middle ear and mastoid. Marked swelling and edema before operation. Erysipelas followed operation in twenty-four hours. Recovery.

J. F. Byington, Battle Creek. *B.*—Woman. Acute mastoiditis. Bacteriological examination at the time of operation showed streptococcus infection. Severe erysipelas followed on evening of second day. No intracranial involvement. Operation performed in new operating room and neither operator or assistants had seen a case of erysipelas for a long time. The infection was evidently from the pus in the mastoid antrum. Death on eighth day.

Wm. Merle Carhart, New York. *A.*—Erysipelas followed infection of the nose by an acute process involving the ethmoid cells and entire nasal cavity of one side. Infection was at first a staphylococcus process of virulent type.

Guy L. Noyes, Columbia, Mo. *A.*—Woman, aged 30. In the forty-eighth day of typhoid. Loss of hearing due to Eustachian occlusion. The mucous membrane of the nose and

pharynx were dry and covered with crusts which left bleeding areas when detached, as is usually seen in typhoid. Catheterization of tubes, inflation of middle ear without satisfactory results. One week later acute suppurative otitis media R. & L. Three days later facial erysipelas. Death on fifty-fourth day of typhoid.

L. D. Brose, Evansville. *A.*—Male, aged 36. Perforating ulcer of septum. Erysipelas spreading from ala nasi. *C.*—Male, aged about 45 years. Acute exacerbation of hypertrophic nasal catarrh. After an application of the galvano-cautery to the right inferior turbinated body, had a severe attack of facial erysipelas. Recovery with an active perforating ulcer of the septum.

Chas. H. Baker, Bay City. *A.*—Male, aged 45. Chronic scabbing left septum. Eczematous crack in vestibule. Facial erysipelas that side of face starting at the crack. *B.*—Three cases four to seven days after operation. Mild attacks. One case, severe attack followed by severe eczema of head and body. Recovery.

Albert E. Bulson, Jr., Ft. Wayne, Ind. *A.*—Case of coryza from influenza complicated by erysipelas. *B.*—Acute exacerbation of a chronic suppurative otitis media. Radical mastoid operation. In forty-eight hours facial erysipelas, beginning at the mastoid wound. Recovery. Another case somewhat similar but milder. *C.*—Erysipelas following application of electro-cautery to the inferior turbinal. Has never had two or more cases in succession and does not know that any of his cases contracted the disease from other cases of erysipelas in hospitals or anywhere else.

W. E. Sauer, St. Louis. *C.*—Female, aged 28 years. Four days after submucous resection of the septum erysipelas of four weeks' duration. Recovery.

Eugene Smith, Detroit. *B.*—Erysipelas of vicinity of wound and scalp of several days' duration following operation for acute disease. Recovery. *B.*—Erysipelas, severe, following operation for chronic disease in poorly-nourished patient. Recovery.

M. V. Ball, Warren, Pa. *A.*—Man, aged 40. Erysipelas originating in furuncle of nose. Infection from finger picking crust. Recovery. *A.*—Man, aged 35. Good history. Infection from a small furuncle in nose. No disease of nasal chambers known previously, pneumonia, septic, delirium, both

orbits immensely swollen and erysipelatous inflammation of skin over forehead and lids. Death in three days from general pyemia and thrombosis of cavernous sinus.

S. E. Allen, Cincinnati. *B.*—Two cases following operation for acute mastoiditis. Both severe—inflammation extending over entire head. After recovery mastoid wounds healed with marked rapidity.

D. T. Vail, Cincinnati. *A.*—One case pansinusitis, right. Recurrent attacks of erysipelas. Finally carcinoma of right upper jaw. *B.*—Boy, aged 11. Operation for acute mastoiditis. Severe erysipelas. T. 105 F. for 10 days. Great pain. Endocarditis. Recovery.

E. E. Mather, Akron. *A.*—One case. Nose had been squeezed. Abscess of cartilaginous septum resulted. Facial erysipelas. T. 104 F. Recovery. *B.*—Babe, 10 months old. Acute mastoiditis. Erysipelas developed within twenty-four hours after operation and ran a severe course. Recovery.

J. Walter Park, Harrisburg. *A.*—Woman, aged 43 years. In the past fifteen years has had three attacks of facial erysipelas always following a severe coryza. Would generally come on after resolution had set in when she was blowing a profuse purulent discharge from the nose. There is no sinus disease.

W. G. Craig, Springfield, Mass. *B.*—*Case I.*—Nurse, aged 26. Ot. med. pur. ac. post-tonsillitis. Operated upon in hospital. Erysipelas on fourth day, side of face and neck. Mild attack. Recovery. *Case II.*—Woman, aged 65. Acute mastoiditis following la grippe. Lived five miles in country. Operated upon at home. Erysipelas very severe fourth day. Unable to account for infection. Neither family physician, nurse nor Craig had seen or attended a case of erysipelas for six months. Recovery slow but perfect.

J. A. Stucky, Lexington, Ky. *B.*—Four cases. Females between 30 and 60 years of age. Operation for chronic mastoiditis. *E.*—Three cases following operations for extensive supuration with great destruction of bone—all were females. While temperature was high, 104-105 F., all recovered. *G.*—Woman, aged 41. Cause attributed to overlooked infected ethmoid cell which infected operative area on fourth day. Severe attack. Recovery.

Cornelius G. Coakley—New York. "I have had it (erysipelas) in frontal sinus cases and have had it in mastoid cases,

and I also believe that the lack of resisting power of the patient has considerable to do with any individual case."

Robert Sattler, Cincinnati. *B.*—Operation for chronic mastoid inflammation. Woman, aged 40. Erysipelas of face and neck developed five days after operation. Recovery. (Hospital case.) *C.*—Extensive disease of anterior ethmoidal cells, middle and lower turbinal associated with blenorrhea of tear sac. Operation on tear sac and nasal duct followed by erysipelas of face and scalp. Two subsequent attacks without surgical interference since then. In good health now but has a purulent discharge from the nose and some discharge from sac. *C.*—One case of extensive epithelial carcinoma of the orbit invading also the frontal, ethmoidal and maxillary sinuses. On the sixth day following surgical intervention, erysipelas of face, scalp and neck. Death one and one-half year afterward from erosion of the dura. Operation performed at home of patient.

Victor Ray, Cincinnati. *B.*—Operation for acute mastoiditis. Woman in bad condition when she entered hospital. Violent attack, but recovery without serious damage.

Geo. P. Marquis, Chicago. *A.*—One case of erysipelas complicating an otitis media.

Huntington Richards, St. Paul's School, Concord. *A.*—Erysipelas in course of chronic mastoid disease in small negro child seen at Vanderbilt Clinic, N. Y., about fifteen years ago. Severe attack. Recovery.

Jas. F. McKernon, New York. *B.*—Four cases erysipelas after operation for acute mastoid disease.

1st case developed 24 hours after operation.

2nd case developed 12 hours after operation.

3rd case developed 2 days after operation.

4th case developed 3 days after operation.

All adults. All were clinic cases. Three of them neglected cases and the disease had progressed for weeks.

L. R. Culberston, Zanesville. *A.*—Eight cases mild facial erysipelas resulting from dacryocystitis due to nasal infection of sac, in all probability. Recovery without lesions in all but one case. *B.*—1. Child of 6 years. Erysipelas following operation for acute mastoiditis. 2. Man of 62 years. Alcoholic. Erysipelas after operation for acute mastoiditis. Severe case. Death.

Geo. B. McAuliffe, New York. *C.*—Erysipelas following

removal of ecchondrosis near the vestibule on right side. Erysipelas was mild and only spread over part of face. Appeared two days after operation and lasted four days. Operation was aseptic and infection was apparently independent of the procedure.

J. F. Klinedinst, York, Pa. *B.*—Man, aged 30. Pain in ear four days, followed by puro-sanguinolent discharge. Profuse discharge of pus. Auricle covered with a number of small pustules, red and swollen. Mastoiditis. Operation. Pus in antrum, no disease of bone. In twenty-four hours erysipelas developed in neighborhood of ear. Extended to mastoid wound and opposite side of face. Unusual aseptic care in operative measures. Infection probably present at time of operation.

J. M. Ray, Louisville. *A.*—Two cases of empyema of the antrum of Highmore. Had been operated upon and the operation wound had healed and the patients were wearing tubes in the canine fossae. One case of erysipelas came on several weeks after operation, the other case six or eight months. Inflammatory process started about the nose and inner angle of the eyes. *B.*—No personal experience with acute disease, but when a hospital interne saw two or three cases develop after operations for acute mastoiditis. One case following a radical operation for chronic disease. Inflammation started around the ear, but got well promptly without infecting the wound. Incision healed per primam.

Chevalier Jackson, Pittsburg. *A.*—Man, aged 27. Three attacks of facial erysipelas, starting on bridge of nose, left of median line. No attack to date since curettage of necrosing ethmoiditis three years ago. *A.*—Man, aged 40. For five years had semi-annual attacks of facial erysipelas starting in various locations. No attack for two years since radical treatment of pansinusitis. *F.*—Fatal facial erysipelas starting under right eye and extending all over upper face and scalp. Commencing on first day and ending on fifth day after evacuation of sphenoidal sinus, in a man 28 years of age.

W. K. Butler, Washington, D. C. *A.*—Following operation for acute disease, facial erysipelas developed extending to but not involving wound. Recovery. Private patient in private room in hospital. No history of contagion could be traced.

H. M. Fish, Chicago. *A.*—*Case I.*—Young woman. Brawny swelling of left orbital region—lids, cheek, root of nose—that made it nearly impossible to open the eye. The condition was

diagnosed erysipelas by a physician. Pain over frontal sinus. Fundus normal. No exophthalmos or ophthalmoplegia. Syringing a mucopurulent secretion from the frontal sinus restored conditions to normal in a few days. *A.—Case II.*—A woman came with left facial erysipelas that appeared two days before. Lids greatly swollen—could not be opened. Marked tense edema of supraorbital region and root of nose. Lower lid and cheek raised almost to level of ridge of nose. Skin tense, glistening; blebs. No ocular involvement. Syringing the sinuses. Restoration to normal in five days. *C.—Case III.*—"Several years ago while in Vienna I removed some large polypi, the nostril being acutely and markedly congested. I plugged the nostril and the following day there was an erysipelas of the root of the nose, cheek and lids of corresponding side. The plugs were removed, revealing a free flow of pus. The patient was not seen again.

J. W. Murphy, Cincinnati. G.—Case I.—Man, aged 26. Operated on for chronic empyema right frontal sinus and antrum. Five days later erysipelas involving entire head. *B.—Case II.*—Girl, aged 2. Operation for acute mastoiditis. Five days later erysipelas developed in wound.

T. Passmore Berens, New York. A.—"I have had but one case of facial erysipelas which could be attributed with more or less positiveness to the nose. This case was one of chronic ethmoiditis of the anterior cells complicated with a general atrophic (ozoenatous) rhinitis. This particular case had four attacks of facial erysipelas, one attack starting in the inner canthus of one eye and the three other attacks starting in a fissure in the vestibule of the nose. These attacks occurred some ten or twelve years ago. The patient has had no attacks for more than eight years. The treatment of the ethmoid has resulted in a cure of his nasal condition, excepting, of course, that the membranes are still atrophied." *B.*—"In the last four or five years I have seen certainly six cases that I can recall (and there was probably more) in which facial erysipelas of a severe type developed following operation for acute mastoid disease. These cases included both hospital and private practice. It may be not unwise to state that the operations were all performed under rigid asepsis. All of the cases mentioned recovered without serious injury resulting."

J. Holinger, Chicago. A.—One case of erysipelas due to acute suppuration of the ear. *B.*—One case of erysipelas fol-

lowing the radical operation for chronic mastoiditis. The erysipelas spread over the back and a large part of the body and the patient died.

Unsigned communication from some member of the American Laryngological Society, the American Otological Society, the American Academy of Ophthalmology and Oto-Laryngology, and the American Ophthalmological Society. *B.*—Woman, aged 56. Erysipelas following upon operation for acute mastoiditis in a small, dirty house. Recovery. *B.*—Erysipelas following upon operation for acute mastoid disease in hospital.

Chas. M. Robertson, Chicago. *B.*—"Woman, aged 27. Chronic suppurative otitis media since 12 years of age. Right ear operated on for radical mastoid Feb. 14th, 1905. Packed wound with iodoform strips. Following day iodoform dermatitis seen on pinna. Gauze removed and plain sterile gauze used. Erysipelas began in two days, extending over face to median line. Streptococcus infection in right leg, knee and ankle joint. Given serum twice daily for ten days. Drained leg and knee joint by aspiration of joint and free incisions in leg, separating muscles and washing out with salt water. Recovery of face in 11 or 14 days. Knee stiff as result. Broken up one year after, but no permanent result."

J. E. Gleason, Detroit. *A.*—"Man, aged 58. Had erysipelas five or six times at varying intervals. Was operated upon for chronic suppuration antrum of Highmore nearly two years ago. No attack of erysipelas since. *B.*—Woman, 44 years. Culture taken from ear at time of paracentesis made a few hours after first symptoms appeared showed streptococcic infection. Operation for acute mastoid disease six days after paracentesis. I would differentiate between erysipelas and streptococcic skin infection clinically. This case was of the latter variety."

W. A. Dietrich, Chattanooga. *C.*—Removed a septal spur from a saloonkeeper. Erysipelas three days later. Patient was a hard drinker—from 1 pint to 1 quart of whiskey a day. Recovery. Nine months later removed middle turbinated from same patient without ill results.

A. B. Thrasher, Cincinnati. *A.*—Woman, aged 30. Tumor inferior turbinate. Used galvano-cautery. In a few days facial erysipelas. Recovery. The patient had had a previous attack of facial erysipelas of unknown origin. There

was a possible involvement of anterior ethmoidal cells. *B.*—Erysipelas three weeks after opening mastoid antrum for acute mastoiditis while the patient was apparently doing well. Patient made a good recovery and the healing of the mastoid wound did not appear to be much hindered.

J. A. Thompson, Cincinnati. A.—Four cases of primary erysipelas of nose and throat. Condition of sinuses not determined. *B.*—One case erysipelas following upon radical operation on an ear that had suppurated for twenty-seven years in which the external wound was closed at the time of operation. Recovery. *C.*—Erysipelas of face and scalp after removal of septal spur. Patient a syphilitic railroad man who had had erysipelas every time he was injured. *D.*—Brewery collector in bad physical condition from drink. Erysipelas of face, neck and scalp following operation upon ethmoid cells. Recovery.

E. Fletcher Ingals, Chicago. C.—"Just one case in which facial erysipelas twice followed the use of menthol—about gr. v to one ounce of liquid albolene."

John H. Kincaid, Knoxville. Man, aged 42. Acute ethmoiditis right and left. Erysipelas beginning at the orifice of both nasal fossae. In twenty-four hours had involved surface of nose, cheeks, forehead and ear. "There was no doubt in my mind but that the erysipelas could be directly traced to the ethmoidal disease."

James B. Clemens, New York. B.—Following operation for acute mastoid disease. "In one case out of about 250 operations. Usual acute symptoms and local conditions in girl of 19 years. Erysipelas developed about fifth day, two days after the first mastoid dressing. It ran an uneventful course."

Jonathan Wright, New York. A.—Three cases erysipelas starting over the bridge of the nose. Were practically all due to nasal infection or rather post-nasal, which regularly holds the streptococcus awaiting a favorable systemic condition. *C.*—One case of erysipelas following upon nasal operation in a case of chronic nasopharyngitis.

James E. Newcomb, New York. A.—Has "seen two or three cases of erysipelas due to infection from abrasions in the nasal vestibule."

C. F. Theisen, Albany. A.—"One case of recurring facial erysipelas complicating a chronic empyema of the frontal sinus. Woman about 45 years of age. I have no doubt but that in

this case the frontal sinusitis was the etiological factor in the facial erysipelas." *C.*—One case following a cauterization of the inferior turbinate in a young lady. No sinus disease.

J. S. Prout, Brooklyn. A.—Facial erysipelas which seemed to result from a leech bite in acute middle ear inflammation. No mastoid involvement."

Allen Greenwood, Boston. A.—"One case of facial erysipelas following acute disease of frontal sinus. After recovery from the erysipelas the frontal sinus was obliterated by operation."

H. Bert Ellis, Los Angeles. A.—Sailor, aged 54 years. Under treatment for dacryocystitis exchronic hypertrophic rhinitis. Erysipelas developed left side of face about left eye. Severe case. Panophthalmitis. Antistreptococcus serum. (See also ocular complications of facial erysipelas.) *A.*—Man, aged 25. Hypertrophic pharyngeal catarrh. Long narrow strip of mucous surface raw and covered with secretion. Application AgNo 3. In twenty-four hours condition improved. Twenty-four hours later facial erysipelas. Recovery. *B.*—Woman, aged 26. Acute rhinitis. Acute otitis media suppurativa. Strepococci in both nasal and ear secretions. Operation. Patient did well. Three weeks later erysipelas. Severe case. "The erysipelas most complete involvement of the entire body I have ever seen." Antistreptococcus serum. Recovery.

Wm. E. Gamble, Chicago. B.—Man, aged 58. Dec. 18th, 1906, removal of inspissated cerumen by family physician. Three days later Gamble found otitis media suppurativa, with perforation M. T. Five days later mastoiditis. Operation. For two days high and irregular temperature. Then erysipelas developed over nose and cheeks. Jan. 8th, 1907, leucocytosis 23,400. Jan. 12th, leucocytes 6,800. Gamble explains: "Sudden rise of temperature with pronounced rigors and cyanosis and extreme leucocytosis as due to streptococci entering the blood in numbers not sufficient to overpower the leucocytes, being themselves overpowered."

H. B. Gratiot, Dubuque. A.—Two cases of erysipelas occurring in connection with acute otitis media, but not following operations.

L. L. Doane, Butler, Pa. A.—"Female, married, aged 40. Hypertrophic rhinitis. Subject to attacks subacute bronchitis, also to fissuring left ala nasi. Erysipelas began near left inner canthus (might have begun at nose). Severe attack. Re-

covery. C.—Male, clerk, aged 20. Saw operation for removal of septal spur. Much hemorrhage. Plugged posteriorly. Two days later mild attack facial erysipelas.

F. L. Waite, Hartford. B.—“Two cases of erysipelas appearing on the third day after operation—one very severe. Both males. Good recovery.”

K. K. Wheelock, Fort Wayne. B.—Medical student, aged 23. Double mastoiditis post-influenza. Double operation in comparatively new and excellent hospital. Three days later rise in T. to 104.8 F., followed by erysipelas appearing over left malar bone. Erysipelas spread widely but did not attack wounds. Severe case. “I attributed the site of infection to be the nasal cavity.” B.—Woman, aged 64. Chronic abscess upper inner angle of orbit. Necrosis ethmoid cells. Following operation patient had a mild attack of erysipelas.

John M. Ingersoll, Cleveland. A.—“One case of repeated attacks of facial erysipelas in a woman who had nasal polypi for a number of years and an infection of both antra, both frontals and all of the ethmoidal sinuses. The removal of the polypi and the treatment of the sinuses stopped entirely the attacks of facial erysipelas. A.—Attacks of facial erysipelas in a man who had an infection in the right maxillary and the frontal sinuses. Treatment of the sinuses cured both conditions. A.—Two cases of repeated attacks of facial erysipelas in atrophic rhinitis without involvement of the sinuses. Both cases were cured of erysipelas and the nasal condition improved by treatment. D.—Operation for chronic maxillary sinus infection followed by erysipelas. Cultures from the antrum gave almost pure streptococci. The attacks of erysipelas complicated matters somewhat, but the patient recovered completely from both conditions.”

J. H. Bryan, Washington. A.—One case of facial erysipelas occurring in a case of syphilis of the nose, the case being one of extensive necrosis of the nasal septum. The inflammation starting within the nose extended to the outer surface and became general over face and scalp. B.—One case following operation for acute suppurating mastoiditis occurring on the second day. The inflammation became general, affecting the face and scalp. A.—One case occurring in the course of chronic disease of the frontal sinus. Owing to a relapse following the first operation on the sinus the cavity had to be reopened and was treated by the open method. In conse-

quence of patient having to spend some time on railroad trains the wound became infected. The inflammation extended from the sinus wound and involved the whole face and scalp.

John Clarence Blake, Boston. *B.*—Cases of erysipelas “originating apparently apart from the mastoid wound, as in one instance on the vertex in a case in which the mastoid wound healed by first intention without subsequent disturbance, and in others in which the starting point of the local symptoms was on the face.”

Henry L. Swain, New Haven. *C.*—Erysipelas following cauterization (of the nose) in a man of 67. *C.*—Erysipelas following the removal of an exostosis in a case in which it was discovered that there was a concealed or latent ethmoiditis, discharging pus from an anterior cell. *B.*—Six or eight cases following mastoid operations. All hospital cases but one. This latter had the disease start from a leech bite which had its bleeding staunched by cotton taken from the wadding of an old and diseased coat. *A.*—“Since receiving this note a patient in a family where I am attending an acute ear case has developed an attack of erysipelas which apparently commenced in the spot on her nose where her eyeglasses rest. One previous attack three years ago.”

B. Alex. Randall, Philadelphia. *A.*—“Young blacksmith with acute otitis media purulenta, whose canal wall posteriorly had a fistula. Erysipelas developed without operation.” *A.*—Erysipelas developed in an operated cataract case although her nose had been gotten into decent condition previously by mild measures. *A.*—Erysipelas occurred in the course of a case of otitis media purulenta.

J. Price Brown, Toronto, Can. *C.*—One case of facial erysipelas following cutting operation upon the nasal septum. Recovery. *C.*—One case of facial erysipelas following electric cautery operation of an inferior turbinal. The condition for several days was very serious. *D.*—One case innumerable nasal polypi right and left. Removal very freely by snares was followed two days later by erysipelas, death occurring in one week. The patient had been greatly exposed to cold and wet after operation. Family physician later informed Dr. Brown that the patient's father died after an operation upon the nose of a similar character followed by erysipelas.

E. S. Ferguson, Oklahoma City. Doubtful case. *A.*—Septal spur on right side impinging upon inferior turbinal.

Removal. Recovery. Three weeks later abrasion of helix of ear. Severe erysipelas developed and covered two-thirds of body.

John A. Donovan, Butte. *A.*—Three cases in men, recently. All had had previous nasal trouble. Inflammation of sinuses not determined but probably present. *C.*—One case erysipelas, woman of 22, following removal anterior end of middle turbinal. *C.*—Saw one case erysipelas follow an operation on frontal sinus while a student at Ann Arbor.

Joseph A. Andrews, Santa Barbara. *A.*—Young man while boxing was struck on nose. Abrasions but no fracture of bones could be detected. A few days later erysipelas. Orbital cellulitis. Exophthalmos. Death in a few days of meningitis. *A.*—Man, aged 71. Furuncle external auditory canal. Incised. Two days later perichondritis auriculæ and erysipelas of face and head. Recovery.

W. Peyn Porcher, Charleston. *A.*—Mastoiditis in an old diabetic subject in which the pus worked its way out above the zygomatic process. Erysipelas followed. Recovery. *B.*—Erysipelas following a secondary mastoid operation affected the whole head, but did not involve the wound itself. Severe case. Recovery.

John R. Winslow, Baltimore. "Woman, about 65. Difficulty in swallowing due to paralysis of pharyngeal constrictors. Velum palati unaffected. History: Severe 'cold' followed by membranous tonsillitis and middle ear infection; subsequently had typical outbreak of facial erysipelas. Streptococcus infection."

J. Payson Clark, Boston. *C.*—"One case of marked facial erysipelas in a child of 10 or 12 years, following immediately on an adenoid operation. Following this there were one or two other cases coming on after operations on the nose or throat at the same clinic." Antisepsis for the rooms and temporary abandonment of operations.

Joseph C. Beck, Chicago. *A.*—"Four cases, all in women. All had fissures at external nares and usually at the menstrual period an edematous surface of the face would occur, last for a few days and then disappear again. No, or very little, temperature and if fissures were healed up and intranasal treatment instituted (there was usually some malformation present) patients remained well." *C.*—Woman, aged 43. Complete filling up of left nostril with myxomatous polypi. Removed.

Facial erysipelas followed with blebs. Cultures showed streptococcus infection. Recovery.

F. E. Hopkins, Springfield, Mass. *A.*—"Two cases of facial erysipelas secondary to infection within the nose. Both were cases of atrophic rhinitis with much crusting of mucus on the septum. The septum was excoriated from the frequent removal of the crusts and with each removal there was nearly always more or less bleeding. In both cases it is probable that infection was conveyed by the fingers. The first patient was a gentleman about 60, a literary man, the second a housewife about 50." *B.*—Marked cellulitis, following mastoid operation involving half the surface of the head. Patient a child of $2\frac{1}{2}$ years. Marked constitutional symptoms. T. 104 F. Iodoform gauze was the initial dressing. The cellulitis promptly subsided with the substitution of plain sterile gauze.

Wendell C. Phillips, New York. *B.*—Has had a number of cases (cannot remember how many in all) following mastoid operation for acute disease. "Three during the present winter, all following the mastoid operation by about five days. All recovered." In chronic disease of the mastoid "one in my service at Post-Graduate Hospital following a flap operation. Recovery."

Thos. R. Pooley, New York (through E. H. Gaudineer, House Surgeon, New Amsterdam Eye & Ear Hospital). *B.*—" (1) Age 28. Operated for acute mastoiditis June 5th. Discharged to return for dressings June 29th. Returned July 8th with erysipelas facialis. Treated locally and constitutionally for two days and then sent to Bellevue Hospital. (2) Age 72. Otitis media purulenta acuta and acute mastoiditis. Operated upon Nov. 29th. Sinus exposed. Next day edema of eyelids and ocular conjunctiva. Dec. 1st, erysipelas facialis. Wound dressed. Treatment local and general. Dec. 2nd, patient worse. Mastoid wound and sinus infected. Treatment continued. Wound dressed daily, but patient continued to weaken. Dec. 13th, patient died of exhaustion, septicemia and erysipelas following mastoid operation."

G. A. Leland, Boston. *A.*—"Occasional cases of facial erysipelas where port of entry seemed to be cracks at the orifices of the nares, ceasing after cracks were healed." "Disease of antrum of Highmore. (1) Male, 35 years. Blow (fracture?), right superior maxilla. Redness and swelling (erysipelas?) right malar region; delirium tremens; discharge from nose.

Caldwell-Luc operation. Recovery. (2) Boy, 4 years. Great redness and swelling right cheek. Rhinitis purulenta (probably specific). Operation canine fossa (Janson) K. I., etc. Recovery." *B.*—Mastoid operation for acute disease. "Several. Recovery not retarded in one. Antistreptococcus serum seemed to control the disease. One woman of 45. Erysipelas followed in few days after operation in private hospital. Recovery in public hospital to which she was sent. Left hospital and in a week or so was back with second attack of erysipelas. Wound healing about as usual." Mastoid operation for chronic disease. "Several. One girl 19. Antistreptococcus serum was followed by nearly normal temperature in about twelve hours." Leland closes his report with the following comments: "In a large municipal hospital, where most of my cases are treated, attacks of erysipelas are not so very uncommon. It hasn't seemed to me that these attacks were in any way due to the location of the operation and in some cases the erysipelas may develop before the mastoiditis necessitates operation, and facial erysipelas frequently simulates mastoiditis when behind the ear, so that occasionally cases are sent in with diagnosis of mastoiditis, for operation, when there is no involvement of the bone."

Louis J. Goux, Detroit. *A.*—"One case of facial erysipelas which I believed to be due to infection through ulcerated area on septum in right naris. The case was further complicated by an acute attack of double otitis media."

Emil Amberg, Detroit. *A.*—"A very severe erysipelas after or accompanying a double otitis media in a physician's wife. . . : I thought at that time that the fact that chloroform was administered for the double myringotomy without protecting the skin with vaseline might have been responsible to some extent for the complication."

Chas. W. Richardson, Washington. *B.*—"The only cases of erysipelas I have had are in connection with the operation on the mastoid. All these resulted from too great effort in the cleansing of the mastoid before the operative intervention, thus denuding the particular surface over and about the mastoid. The flowing of the bacteria-laden pus over this surface gave rise to the erysipelas which ensued. Since I have ceased the vigorous cleansing of the mastoid I have had no cases of erysipelas, thus apparently proving my conjecture as to the cause."

A. Coolidge, Jr., Boston. *A.*—"I have for some time looked upon facial erysipelas starting from the region of the nose as

due to intranasal or vestibular infection, although often no point of infection within the nose can be proven. Without having any records at hand I should say that in many cases of facial erysipelas there is to be found a marked septic condition in the nasal vestibule or vicinity. *C.*—A severe facial erysipelas developed a few days after I had opened a foul antrum through the inferior meatus. The erysipelas started near the ala on the same side."

Chas. J. Kipp, Newark. *A.*—"I have had a number of cases of otitis media purulenta in which facial erysipelas developed while there was otorrhea. The erysipelas started from the external meatus and traveled over the face and neck." *B.*—Cases of erysipelas following operation for acute and chronic mastoiditis. Unable to give numbers. All recovered.

Hanau W. Loeb, St. Louis. *C.*—A patient developed erysipelas ten days after a spur operation. He had failed to present himself regularly for observation. Recovered.

Walter J. Freeman, Philadelphia. *A.*—"In my hospital experiences it was quite common to have patients having had frequent attacks of erysipelas. . . . One case of atrophic rhinitis now under treatment gives a history of repeated attacks of erysipelas before treatment a year ago, but none since then."

F. L. Knight, Boston. *C.*—"The only case of facial erysipelas I remember occurred in a patient during an acute inflammation in the antrum. She has since had one acute exacerbation of the antrum disease (without erysipelas), which quietly subsided, she declining operation."

Wm. C. Bane, Denver. *A.*—"Woman, aged 34. Tuberculous subject. Acute double otitis media and mastoiditis. Streptococcic. Operation on right mastoid seventh day. Not much involvement. Erysipelas third day after operation. Pleurisy fourth day. Death seventh day after operation. No attempt at repair in wound."

J. E. Sheppard, Brooklyn. *B.*—"A considerable number of cases of erysipelas following mastoid operation for acute disease. All did well save two—one, a diabetic, mastoid wound nearly healed, infected by general practitioner fresh from a case of puerperal sepsis; died finally from meningitis. The second, an elderly woman, died in almshouse after leaving my care."

Francis W. Alter, Toledo. *C.*—"Recently, I resected a de-

flected septum nasi and for a week thereafter patient did well, but at that time he came down with a well-defined attack of erysipelas, which evidenced itself first over the dorsum of the nose. I thought at first that he was in for an abscess because of its circumscribed character, but soon the other symptoms of erysipelas appeared. . . . There seemed at no time to be any retardation of the healing process." After a week, recovery.

John W. Farlow, Boston (in addition to cases cited in the text). *E.*—Man, 70 years. Nasal polypi and polypoid degeneration in right ethmoid region. Removal of polypoid tissue with cold snare; considerable bleeding; gauze packing; marked facial erysipelas starting on same side of nose the next day. Recovery.

Sargent F. Snow, Syracuse. *C.*—Two cases, one private and one public hospital, in which erysipelas followed operation on nasal septum. The origin of erysipelas in private case unknown; of the hospital case, "was clearly from the infection that existed in the ward."

Henry Manning Fish, Chicago (in addition to previous communication): "A day or two after writing you I was allowed to examine a patient of Dr. J. H. Cook, who was suffering from facial erysipelas covering the entire face, head and ears. There was a distinct history of an acute right maxillary empyema four years before, with spontaneous discharge through the nostrils. About ten days before I saw the patient, following influenza, she had another attack of right maxillary empyema, intense pain, swelling of the cheek, etc., with subsidence after a profuse right nasal discharge. A few days later erysipelas appeared at the root or bridge of the nose, spreading therefrom as mentioned above. When I saw the patient she was desquamating and numerous blisters on the face and scalp had dried up; the fever had subsided and she was convalescing. . . . I took one culture from pus on the floor of the nostril and a second one from pus in the right middle meatus. Dr. Gehrmann, of the Columbus Medical Laboratory, reports streptococcus in each culture."

Francis R. Packard, Philadelphia. *A.*—"I have seen two cases of erysipelas occurring in both instances in adult males, involving the side of the face and originating in what seemed to be a furunculosis of the nasal vestibule. *B.*—I performed a Schwartze-Stacke operation upon an Italian at the Pennsyl-

vania Hospital for acute mastoiditis occurring in the course of typhoid fever. The operation was performed upon the thirty-second day of the disease. Four days after the operation erysipelas developed on the side of the head on which the operation had been performed. The resident in charge of the case had been directly in contact with several cases of erysipelas occurring in the hospital. Boy, aged 10. Acute otitis media purulenta left ear. Considerable edema below left mastoid. Mastoid opened—porous and soft—large central cavity containing pus. Four days later developed erysipelas in neighborhood of operative wound. Very ill for four days. Mastoid wound and ear completely healed in four weeks.

Thos. Hubbard, Toledo. *A.*—"Many of the cases of facial erysipelas that I have seen have had primary or secondary nasal and throat manifestations. In a few the primarily infected area was an excoriation in anterior naris, whence it spread to deeper regions and over the skin. I cannot trace any case to known sinus disease, but have suspected general sinus infection in all severe cases involving nares secondarily. A recent case of erysipelas in an infant, contracted from grandparent who had subacute or chronic type of facial erysipelas, involved throat, nares, face and scalp. Had to amputate uvula on account of obstructed respiration. Streptolytic serum in large and repeated doses kept the youngster alive for four or five days, that is, temperature would drop and symptoms ameliorate temporarily, but death come finally from exhaustion due to persistence of infection and relapses."

Gordon King, New Orleans. *C.*—"Have seen one case due to infection of nose following a submucous resection of septal cartilage and another following cauterization of the inferior turbinal."

B. L. Millikin, Cleveland. *A.*—"Some years ago I had a case of erysipelas following on an acute attack of middle ear abscess, and was myself infected through the tear duct probably and the antrum of Highmore, but not after any operative procedure."

G. W. Spohn, Elkhart, Ind. *A.*—"Has had cases of facial erysipelas which he considers due to disease of the nose or its accessory sinuses."

A. R. Amos, Des Moines. *C.*—"One case developed erysipelas following removal of middle turbinate with scissors and snare. It recovered after a general facial erysipelas of the same side."

Harris G. Sherman, Cleveland. *C.*—Woman, aged 34. After galvano-cauterization of the inferior turbinate a violent erysipelas ensued, involving entire head; extended over body. Death four weeks after operation.

W. Scott Renner, Buffalo. *B.*—Mastoid, acute disease. "Developed erysipelas three days after operation. Complete recovery with no loss of hearing." Mastoid, chronic disease. "Patient facial paralysis twelve hours after operation and facial erysipelas. Complete recovery from paralysis and erysipelas. Chronic discharge cured." *C.*—"Erysipelas developed after the removal of hypertrophied tissue on the lower turbinated bone. Uninterrupted recovery. This patient has had previous and subsequent attacks of erysipelas." *E.*—"Patient has ethmoiditis, maxillary sinusitis and nasal polypi. The erysipelas developed after removing polypi. Ran uninterrupted course to recovery.

Arnold Knapp, New York (in addition to cases cited in the text). Pansinusitis. Severe and finally fatal case. After the first operation, attacking the right ethmoid cells and frontal sinus, erysipelas appeared at once with a T. 104 F. While this condition persisted, although the symptoms of sinusitis of the left ethmoid and frontal were urgent, it was thought best to defer opening these cavities. The operation on the left side was not undertaken for a month after that on the right. Osteomyelitis of the bones of the skull and face set in (a streptococcic infection of a low grade intensity), extended to the squamous portion of the right temporal bone, causing an epidural abscess with thrombosis of the sigmoid sinus, pyemia and, notwithstanding active surgical measures wherever pus was suspected, finally caused the death of the patient. (Reported in Archives of Otology, Vol. XXXII, No. 3, 1903.) *B.*—Two cases of erysipelas following on operations for acute mastoiditis. One case of erysipelas following on operation for chronic mastoiditis.

H. A. Alderton, Brooklyn. *B.*—A number of cases of erysipelas following operation for acute mastoid disease. *A.*—"Have just done one operation on a case in which the erysipelas preceded the operative attack; sequence, the grip, ear pain for one week, rupture, seen by me for first time, erysipelas next day, treatment of erysipelas for a week or one and a half weeks, operation showed great destruction but intact inner table. Recovery." *B.*—A number of cases following opera-

tion for chronic mastoid disease, "though I think only in acute exacerbations of the chronic trouble and mostly associated with dermatitis of the canal. All my cases have recovered even when the dura was exposed."

Arthur B. Duel, New York. *B.*—After operation acute mastoid disease. "Three cases in clinic. Facial erysipelas. All recovered. Two cases in private practice. Facial erysipelas. Both recovered." After operation, chronic mastoid disease. "Two cases in clinic. Recovered. One in private practice. Extensive, whole of head, chest and back. Desperately ill. Recovered."

Having thus reviewed the facts at some length and noted the theories put forth by various observers, both American and Continental, let us see to what conclusions these facts, more or less illuminated by these theories, will certainly and unavoidably lead us.

First.—The identity of the streptococcus as the *contagium vivum* or microbial cause of erysipelas is a fact of such universal knowledge as to call for but formal mention. It is necessary, however, to call attention to a few of its characteristics. It is of slow growth and of variable morphology when its environment is changed. Its pathogenicity is also a matter of variability. It is probably but rarely air borne, needing direct personal contact in the vast majority of instances for its transference, so that Ohlmacher speaks of their "well advanced adaptation to parasitism."

Second.—We note the practically constant presence of the streptococcus and the pneumococcus in the normal nose and neighboring spaces, such as the throat and the mouth, and possibly the normal accessory cavities and the ear. The observations bearing on this fact I have taken care to give you in great detail.

Third.—We recognize the great variability in pathogenicity of both the streptococcus and the pneumococcus. Both, as we know, lie latent for months, for years, and even for an entire human lifetime, may bring forth absolutely countless millions of generations upon the hospitable pituitary mucous membranes of their host without betraying by a single overt act their presence. But this quiet and indolent existence may be broken in upon at any moment. Man has again and again produced this disturbance and roused these cocci to virulent fury under laboratory conditions, and nature has produced these same

storms in the human host of the streptococcus and the pneumococcus either (a) by temporarily and through some unknown cause inducing virulence in the microorganisms, or (b) through some unfavorable conditions which profoundly affect the patients and alter the constitution of the fluids and probably also the solids of the body, thereby supplying that environment which is necessary to induce the change which we call virulence, which consists essentially in a tremendous stimulation of the reproductive energies of the cocci with an attendant formation of toxins.

Fourth.—This process just referred to is not an unusual one in microbial pathology. We are familiar with practically the same phenomena in the life history of the typhoid bacillus and the bacillus tuberculosis.

Fifth.—The extreme frequency of erysipelas upon the face, as compared with its invasion of other parts of the body, has been noted for centuries. Only recently has the discovery that the cavities of the bones of the face—indeed, that the whole upper air tract—is the normal habitat of the microbial cause of erysipelas furnished us with a rational explanation of this predilection, and I have no doubt that, now that the attention of the general physician and surgeon is called to this matter by the rhinologist, we will find that many mysterious outbreaks of erysipelas or other streptococcus infection will be traced to some diseased nasal passage among the entourage of the patient. I have in mind the case of a distinguished Philadelphia obstetrician (communicated to me by one who was acquainted with the last generation of Philadelphia physicians) who in the latter years of his life left behind him a trail of puerperal sepsis which counted some 90 or 100 cases and which was attributed by his colleagues to the fact that he was afflicted with a chronic ozena.

Sixth.—I have cited to you a large number of spontaneous cases and surgical accidents occurring under the observation of a very small proportion of trained and educated men who make up our great American medical profession. These cases and accidents are just such as one would expect to occur in a certain proportion of patients under these known conditions. It must be a fact that modern aseptic and antiseptic methods has reduced the number of these infections where the virulence of the cocci has been mild, but the anatomical arrangement of the parts and the fact that virulent streptococci in rapid multi-

plication are only destroyed by very strong antiseptics of escharotic action makes it impossible to prevent the infection in every case. Think of a virulent streptococcus infection of the mastoid. It is a physical impossibility to prevent a possible infection of the freshly-wounded soft parts while the diseased bone is being slowly and carefully chiseled and curetted away. Or, again, think of the infected frontal sinus, tense with pus, with its exit closed by inflammatory swelling and colonies of streptococci penetrating the mucous membrane, invading the periosteum and eroding the upper layers of the bone. In some cases thorough exenteration of the sinus and the ethmoid cells cannot possibly reach and destroy every fold and crevice of the latter which harbor the multiplying streptococci, and a thorough operation necessarily involves most extensive wounds of the skin and subcutaneous tissue, the mucous membrane and submucous tissues, the periosteum and the bone. And yet the more violent the inflammatory process, the greater probability, theoretically, that we are in the presence of a virulent infection, the more imperative it is that we should immediately evacuate the pus cavity through a wound of our own making that drainage may be rapid, direct and free, and the life of our patient be not imperilled by a streptococcic invasion of the cranial cavity, the meninges and the brain.

I submit that we have reached that point in our knowledge of this subject where we can say with positiveness that erysipelas is a streptococcus infection which is almost invariably an autoinfection from the upper air tract of the patient, and that in those rare cases where it is not an autoinfection the infection is derived from the air passages of some one in contact with the patient in some capacity. Modern knowledge of contagion and modern methods of cleanliness have practically entirely done away with the old epidemics of erysipelas that used to invade hospitals or communities some thirty or forty years ago.

In the prosecution of this study I have been struck by the comparative frequency of a serious involvement of the eyes and ears in the course of a facial erysipelas. That corneal ulcers or a keratomalacia should appear as a result of the violent inflammation of the lids and the tremendous pressure of the palpebral edema is not to be wondered at, but the fact of the matter is, that a variety of conditions supervene from apparently an identical cause, streptococcus infection, and the

resultant pathological state must be determined by the local conditions existing in each patient. Apparently, we never or rarely see some of these conditions in America. For instance, the French frequently, and the Germans occasionally, speak of a chronic thickening of the lids which occurs as the result of recurrent facial erysipelas, and resembles the condition of the skin in elephantiasis. Lavrand was, I believe, the first to describe this condition which he observed in a boy of 15. There was no condition of the eye itself which would afford an explanation of this strange phenomenon and Lavrand therefore connected it etiologically with a facial erysipelas which had recurred again and again and had always originated in the nasopharynx. The mucosa of the nose was swollen and Luschka's gland was enlarged. The treatment of this condition healed the affection of the lids. The correctness of this observation was subsequently confirmed by others. Parinaud, Uhthoff and Winckler have given us excellent descriptions of the various forms of streptococcus conjunctivitis and have connected these directly with disease of the lachrymal drainage apparatus, which as we know is itself a result of an inflammation of the nasal mucous membrane. Indeed, Winckler says, "The streptococci, as well as the staphylococci, which can produce acute inflammation of the mucosa of the upper respiratory tract, must be considered as etiologic factors in conjunctivitis."

Most authors who describe cases of atrophy of the optic nerve consecutive to attacks of facial erysipelas appear to consider that this is a compression atrophy due to orbital edema or abscess. This view, as you will observe from the cases cited, cannot always be borne out by the symptoms present or the results of physical examination. Hajek (86), the rhinologist, has pointed out that "The dissemination of the streptococcus in an erysipelatous eye is sufficient cause by itself. Their power to do harm is proportionate to the toxins they produce. Their growth in the lymphatics extends in all directions so that they travel in dense masses in the direction of the interstitial spaces and they also penetrate the tissues themselves in every direction. If the erysipelas involves the orbit they wander to Tenon's capsule, from here to Tenon's space and the optic disc, eventually then to the prolongations of the pia about the nerve and into the connective tissue which ensheathes the central vessels of the optic nerve. Even the

walls of the vessels are penetrated by the cocci and thus changes are produced in the vessels themselves."

In conclusion, I would submit for your consideration the following cases of ocular and aural complications due to and occurring in the course of erysipelas of the face, observing merely that they illustrate exhaustively the conditions that have been discussed in the paper.

Woman, aged 50. Five attacks empyema right frontal sinus, five months. Upper lids swollen and edematous, bony walls tender. Eye normal. Anterior extremity right middle turbinal bathed in pus. Middle turbinectomy. Two days later frontal sinus operation. On the following day pain. T. 100 F. On second day dressings were changed; some edema of upper lid and slight exophthalmos; wound clean; on raising lid patient exclaimed she could not see. Pupil fixed and semi-dilated. Ophthalmoscopically retina hazy and edematous; arteries small, inferior temporal artery obliterated; no swelling of disc. Three small hemorrhages about macula. Later atrophy and total blindness. The frontal sinus wound healed promptly. In the discussion which followed, Dr. Meierhof stated that he thought the condition was produced by a secondary orbital cellulitis.—Arnold H. Knapp, *Archives of Ophthalmology*, Vol. XXX, p. 308. (Compare this case with that of E. E. Foster, New Bedford, Mass., and case of J. H. Farlow, Boston, Mass.)

Girl of 18. Entered hospital for her second attack of erysipelas, the first having begun at the ala of the nose. Each attack occurred at a menstrual period. Severe attack. Several days after convalescence began, vision failed in one day and she was not able to count fingers. Ophthalmoscopic examination revealed atrophy of the optic nerves. Nothing abnormal with the yellow spot, the retina or the choroid.—These de Bordeaux, 1887, Colle.

Erysipelas following a wound of the lid. The right eye was closed for one month—when opened was completely blind. Paralysis lev. palp. sup. All the movements of the eye limited. Opacities of the lens. Disc pale. Vessels reduced, many completely empty. Pigmented spots in region of macula.—*British Medical Journal*, 1878.

Erysipelas, orbital abscess. Protrusion and immobility of the globe, chemosis. Tumefaction of the lids which were not able to cover the globe. Ophthalmoscopically the fundus appeared whitish, studded with numerous hemorrhages, arteries invisible,

numerous veins dilated.—Knapp, *Revue d'ophthalmologie de Dor et Meyer*, 1885.

Woman, aged 68. Three months previously facial erysipelas followed by an orbital abscess. Rapid diminution of vision of right eye. Ophthalmoscopically, notwithstanding an immature cataract, one could determine an optic atrophy $V=0$.—Ramirez *N. Montpellier Med.*, 1897.

Woman. Severe attack of facial erysipelas. Abscesses, etc., of the lids. Exophthalmos. Mobility intact. Cornea clear. Anterior chamber normal. Posterior synechia. Lens and media clear. Ophthalmoscopically, left eye disc greyish white, slightly excavated, vessels reduced. Vision abolished.—Cabbannes, *These de Bordeaux par Fauveau*, 1903-1904, No. 94.

In a thesis at Basle, 1882, Anton Schwendt gives the following statistics: He studied 44 cases of phlegmon of the orbit, followed by diminution or loss of vision. Sixteen cases were due to erysipelas of the face, 4 of which had a fatal termination through thrombosis of the sinus or meningo-encephalitis. The author added to this group 4 cases not figuring in the statistics, where an erysipelas was followed by atrophy of the optic nerve and in which the inflammation of the cellular tissue of the orbit was not demonstrated, although probable. As a cause of abscess erysipelas entered into more than 1/3 of the cases. These cases consecutive to erysipelas are very menacing to the vision. In Schwendt's collection of 18 attacked not one recovered. These phlegmons reveal a high mortality—30.7 per cent.—*These de Bordeaux, Colle*, 1886-1887, No. 106.

Chambermaid, aged 30. Attack of erysipelas of moderate severity, terminating on the eighth day. Edema of the lid, hyperemia of the conjunctivae—double iritis with posterior synechiae. Recovery. *Vidal, Gazette Med. de Paris*, No. 44, 1862.

Floating opacities formed in the vitreous humor, constituting a network interrupted here and there by membranes in shreds during the course of a facial erysipelas.—Mathias, *Recueil de medicine militaire*, 1869.

Among eight observations gathered by the author there were five monocular optic nerve atrophies and three that were binocular. In the five monocular cases the erysipelas had in two cases been consecutive to a wound of the same side which had not directly injured the eye. In four cases the erysipelas had been more pronounced on or else limited to the side on

which the optic atrophy had occurred. In three cases paresis of the lev. palp. sup., restriction of movement of globes, slight exophthalmos, but no decided evidence of orbital abscess. In all cases loss of vision appeared during the course of the erysipelas. The sound eye was not attacked following the atrophy of the nerve.—Parinaud, *Journal de médecine et de chirurgie pratique*, Oct., 1879.

In discussing cases of this character Panas said, "Numerous anastomoses of the ophthalmic vein are known. Recently Gurtwisch has again demonstrated by beautiful injections that numerous vessels unite the ophthalmic to the veins of the pterygo-maxillary fossa and in particular the sphenopalatine."—*Semaine medicale*, 1885.

Lapersonne said also that phlebitis of the ophthalmic vein and of the cavernous sinus was known to have been caused by lesions of the mouth, pharynx, lips and nasal fossae, such as septic wounds, furuncles, anthrax and especially erysipelas.—*Semaine medicale*, 1885.

Death on the nineteenth day of a facial erysipelas after delirium, grinding of the teeth, muscular contractions, pupillary irregularity. On the thirteenth day coma, dilated pupils, paralysis. On autopsy, thrombosis of the ophthalmic vein and the transverse sinus with cloudy effusion into the arachnoid. Weber quoted by Colle.—*These de Bordeaux*, 1886-1887, No. 106.

Ripault refers to a case exhibiting crops of chalazia after facial erysipelas and makes the following citations without giving the name or date of publications: Annular bands or paracentral plaques of the cornea, losses of substance bordering upon perforation of the lens (Gallsowski). Acute iritis monocular or binocular (Hanson, Vidal). Tardy iritis occurring in convalescence, analogous to that of typhoid or variola (Dor). Neuroretinitis with retinal hemorrhages (Satler). Neuroretinitis due to numerous microbial embolisms (Nernheiser). Thrombosis of the central vein (Knapp). Detachment of the retina (Heineche). Des complications oculaires de l'erysipéle de la face (H. Ripault). *Gazette Médicale de Paris*, April 20th, 1895.

Case of facial erysipelas. "One week after the beginning of an attack, without previous pain or special local swelling and without any symptoms in the throat or nose, pus began to flow from the right ear. At this time the walls of the external auditory canal were normal and the pus obviously

came from the middle ear through an opening in the drum head."—J. A. Lippincott, *Medical News*, Philadelphia, 1890, LVII, p. 309.

Woman, aged 70. Erysipelas of the face having begun at the nasal orifice on the right half of nose and cheek. Throat red and tongue dry. Followed by optic neuritis and atrophy after edema of the lids, exophthalmos, ophthalmoplegia externa, chemosis, pupils dilated one-half and clear cornea.—F. Terrien, *Neurite et atrophie optique au cours de l'Erysipele*. *Progres Med.* Paris, 1904, XX, p. 165.

Man, aged 53. Facial erysipelas that began on mucous membrane of the lower lip. Intense earache. Pharyngitis. Rhinitis with tumefaction. Rupture of M. T. Mastoid red and tender. Paracentesis M. T. Recovery.—H. V. Würdemann, *Medical News*, Nov. 21st, 1891.

Unilateral orbital abscess, optic neuritis and blindness following facial erysipelas in which there was a continual purulent discharge from the corresponding nostril.—Carl, quoted by Fish, *American Journal of Surgery*, Sept., 1906.

Case of erysipelas, redness and swelling of the inner corner of the eye, much periorbital pain, considerable ptosis, limitation of movement, orbital fistula in upper and lower lid, no perception of light. "Several months before the attack he had for a considerable time a yellow discharge from the nostrils, sometimes offensive. This had quite ceased before the erysipelas and there seems, therefore, very little reason for supposing that the orbital inflammation was propagated from the nose." (!)—Nettleship quoted by Fish, *American Journal of Surgery*, Sept., 1906.

Man, aged 53. Incision of abscess of brow followed by erysipelas. Edema of the lids. Chemosis. On ninth day the cornea became lustreless, pupil hazy, anterior chamber reduced, tension plus. Delirium, coma and death on tenth day.—Warlomont, *Ann. d'Oculistique*, Paris, T. LXVI, Nov.-Dec., 1871.

Woman, aged 40. Abscess inner canthus right eye. Strabismus internus. Rapidly spreading excoriation lower one-third cornea, hypopyon and iritis. Anesthesia cheek and conjunctiva. Prolapsus and phthisis bulbi threatened. Patient recovered with lower two-thirds of cornea opaque.—Neve, *Brit. Med. Journal*, 1886, Vol. 1.

A serpiginous ulcer occurred on the lower third of the cornea. Microscopically it resembled a diphtheritic inocula-

tion.—Horner, *Klin. Monatsbl. f. Augenheilkunde*, 1875, s. 442.

Woman, aged 32. Erysipelas after the extraction of a tooth which had caused a swelling of the jaw. Skin of left upper lid deep violet, smooth, glistening. Enormous chemosis, palpebral and ocular conjunctiva. Closure of palpebral fissures impossible. Exophthalmos. Dislocation of globe outward. Orbital abscess, haziness of cornea, iritis, pupillary exudate, amaurosis, phthisis bulbi.—Fetzer in *Arlt's Bericht über die Augenklinik der Wiener Universität*, 1863 bis 1865, Wien 1867, s. 116.

Woman, aged 30. Erysipelas four years previously. Anchyloblepharon. Staphyloma corneae requiring enucleation. Examination showed previous ulceration and adhesion to tarsal connective tissue.—Kimeni, *Bullet. d'Oculist*, T. IX, p. 17.

Circumocular erysipelas after blepharoplasty on left eye. Corneal ulcer, perforation, general haziness and softening. Phthisis bulbi and cicatricial shrinking of the lid.—Warner, *Klin. Monatsbl. f. Augenheilk.*, 1872, s. 337.

Seventy-seven cases ocular involvement in the course of erysipelas; 16 cases—involvement of lids and orbit without affection optic nerve; 37 cases—involvement of lids and orbit with affection optic nerve; 13 cases—involvement of optic nerve without orbital disease; 7 cases—involvement of uveal tract.—Lewin & Guillery, *Die Wirkungen v. Arzneimitteln u. Giften auf das Auge*, Vol. 2, p. 31. Berlin, 1905.

Erysipelas with gangrene of the four lids.—Castresani *Spanish-Americ. Ophthal. Gessllsch.*, Apl., 1904.

Secondary involvement of the lachrymal organs. Cané, *Gazette de'Ophthalm.*, 1882. No. 5.

Thirty-five cases of orbital cellulitis with a mortality of 29 per cent. Of the cases which survived there were blind; bilaterally, 60 per cent, incomplete recovery of vision, 12 per cent, complete recovery of vision, 12 per cent. Knapp, *Archiv. f. Augenheilk.*, Bd. XIV, p. 257.

(a) Exophthalmos, necrosis of the lid, ulceration of the cornea, vision unaffected. (b). Edema and abscess of the lids. (c). Chronic rhinitis with erysipelas. Acute abscess of the upper lids. Necrosis of the skin of lids. Sloughing with exposure of orbicularis muscle. Streptococci in pus.—Mitvalsky, *Klin. Monatsbl. f. Augenheilk.*, 1893, s. 18. Aschenborn, *Archiv. f. Klin. Chirurgie*, XXV, s. 154.

Girl, aged 25 years. Edema of lids. Chemosis, subconjunctival hemorrhage. Ophthalmoplegia externa. Dislocation lachrymal gland. Exophthalmos.—Imre, *Klin. Monatsbl. Augenheilk.*, 1876, s. 187.

Man, 26 years. Edema of the lids, hyperemia of the conjunctiva, slight exophthalmos, chemosis inner canthus, ophthalmoplegia externa. Orbital abscess. Complete recovery.—Williams, *Boston Med. and Surg. Jour.*, Vol. CVIII, p. 51.

Boy of 6 years. Edema of the lids. Exophthalmos right eye. Ophthalmoplegia externa. Chemosis lower half ocular conjunctiva. Orbital abscess. Complete recovery after two and one-half months.—Williams, loc. cit.

Bilateral inflammation of the retrobulbar connective tissue. Brain was not involved and there was complete restitution of vision.—de Smet, *La Presse Medicale*, 1878, p. 137.

Girl of 15 years. Edema of lids, chemosis, exophthalmos. Congestion and tortuosity of veins of right fundus. Epidural abscess in temporal and middle cerebral fossa, necessitating chiseling away of zygomatic process of frontal and the frontal process of zygomaticus down to the ala magna of the sphenoid; also removal of temporal wall of orbit. Recovery without injury to eyeball or vision.—Nieman, Inaug. Dissertation, Griefswald, 1901, s. 7.

Small abscess right upper lid. Erysipelas. Exophthalmos gradually disappeared in the course of a year.—Lippincott, *Trans. Am. Ophthal. Soc.*, Boston, 1885, p. 702.

Cryptic erysipelas in a girl of 9 months who had previously been perfectly healthy. Convulsions, orbital abscess. Liberation of pus containing streptococci and staphylococci. Recovery.—*Bulletin et Mem. de la Société française d'ophtalmologie*, 1898, p. 57.

Man, aged 39. Erysipelas after fever and pain in bottom of right eye. Edema of lids. Tenth day, gangrene of lids. Exophthalmos right eye. Ophthalmoplegia externa. Cornea hazy, dry, non-sensitive. Pupil irresponsive. Yellowish cloudy mass in fundus. T. +. Rupture of globe emitting offensive pus. Removal of lids. Enucleation of globe. Necrosis and sloughing of orbital tissue.—Biermann, *Klin. Monatsbl. f. Augenheilk.*, 1869, s. 91.

Primipara, 33 years. Nasopharyngeal catarrh. Erysipelas two days after delivery. Edema of lids. Gangrene skin of right lid from the lashes to the brows. Streptococci in the

necrotic masses. Bulbar conjunctiva ulcerated. Small abscesses in lower part of cornea. Exophthalmos, amaurosis, orbital abscess. Iris discolored, pupil small and adherent to lens. Hypopyon, corneal perforation, prolapse of iris. Exenteration of globe. Ectropion both lids.—Joss. *Correspondenzbl. f. Schweitzer Aerzte*, Bd. XXXI, 1901, s. 617.

Erysipelas after shelling out an orbital cyst. Panophthalmitis.—Kraotschenko, *Abhandl. der Gesellsch. russ. Aerzte zu Petersburg*. Jahrg. LIV, s. 125.

A man of 38 had had a phlegmonous facial erysipelas while a child. As a result of this the entire face, including the nose, ears and eyelids, had been converted into a smooth cicatrix. The nose and the mouth were each designated by an opening. In the mouth could be seen the atrophic tongue grown fast to the alveolus and one remaining tooth. The eyelids could be felt through the skin.—Santos Fernandes. *Ophthalmol. Klinik*, 1900, No. 14.

Woman, aged 60. Involvement of right lachrymal sac. Edema of lids with formation of blebs. Coma, delirium and death on fifth day. Autopsy revealed abscesses about nasal duct in the right lid and in the orbit.—Piorry, *Clinique Medicale*, 1833, p. 381.

Man, aged 42. Pustules of lids. Orbital abscess. Death on the thirteenth day. Autopsy. Bilateral orbital abscess. Both globes atrophic. Pus in Tenon's capsule. Vein of fissure of Sylvius tense with yellow contents. Yellow fluid in subarachnoid spaces. Cerebral necrosis. Nucleus of right lens contained an area filled with micrococci.—Schüle, *Archiv. f. pathol. Anatomie*, Bd. LXVII, s. 125.

Boy of 5 years. Contusion of left eyelid. Erysipelas. Third day exophthalmos both globes. Fifth day orbital abscess (left) opened spontaneously. Ulceration right cornea, perforation. Death eleventh day. Autopsy. Pus in cavernous sinus and middle cerebral fossa. Abscess right orbit and diffuse purulent infiltration of orbital fat. Small abscess in left orbit.

Man of 43. Exophthalmos left globe. Ophthalmoplegia externa. Chemosis. Later, chemosis right eye. Left frontal vein could be felt as hardened cord. Delirium, stupor, facial paralysis, death in six days. Autopsy. Dura at base of middle cerebral fossa covered by punctate extravasations and an exudate. The optic nerves in their foramina were surrounded by pus. Pia at the base infiltrated with pus. Islands of pus in

the orbit, in the ocular muscles and along the veins.—Bayle, *Prager med. Wochenschr.*, 1881, s. 221.

Girl of 15 years. Abscess of lip. Incision. Erysipelas. Exophthalmos. Right pupil fixed. Death in six days. Autopsy. Purulent phlebitis left anterior facial vein which extended into the left superior sinus petrosus. Orbital tissues were edematous.—Cohn, *Klin. der embol. Gefässkrank.*, 1860, s. 196.

Out of 221 cases of optic atrophy, 14 were due to erysipelas.—Uthoff, *Klin. Monatsbl. f. Augenheilk.*, 1900, s. 533.

Of 51 cases of erysipelas in which the vision became affected there were changes in the fundus of the eye in 37. The fundal changes were unilateral in 25 cases and bilateral in 12 cases. Convalescence with complete or partial restoration of sight occurred 8 times or in 16 per cent of the cases.—Lewin & Guillery, *Die Wirkungen von Arzneimitteln und Giften auf das Auge*, Vol. 2, p. 31. Berlin, 1905.

Girl, aged 12 years. Left globe, ophthalmoplegia externa, exophthalmos, connective tissue red and edematous. High grade of amblyopia. Meningeal symptoms and death on the eighth day.—du Gourlay, *Annales d'Oculistique*, T. CXXX, p. 199.

Man, aged 28. Infiltration of the lids. Exophthalmos left eye. Orbital abscess, ophthalmoplegia externa, amaurosis, perforating ulcer of cornea, phthisis bulbi. After several weeks, death due to bronchitis and debility.—Noyes, *Richmond and Louisville Medical Jour.*, July, 1875, p. 856.

Girl, aged 20. Bilateral abscess of orbit. No suppuration in either eye, but there was a total and complete amblyopia with dilated pupils.—Demarquay, *Traité des tumeurs de l'orbite*, 1860, p. 134.

Man, aged 60. Abscesses of the left lids. Improvement after incision. About two weeks later increasing chemosis, exophthalmos, diminished rotation and amaurosis. Greyish yellow discoloration of the fundus and slight contraction of retinal vessels. Orbital abscess. Amblyopia permanent. Optic atrophy.—Williams, *Boston Med. and Surg. Jour.*, Vol. CVIII, p. 51.

Man, aged 64. Abscess right lids. Chemosis. When eye could be opened was found amaurotic. Exophthalmos, but no discoverable orbital abscess. Atrophic changes in disc. Vessels contracted. Amaurosis permanent.—Williams, *loc. cit.*

Man, aged 41. Erysipelas after a fall. Right eye closed for four weeks. When finally opened totally blind. Cornea clear, pupil dilated and immobile, media hazy, disc pale bluish, atrophic appearance. Arteries contracted, some empty and some contained blood only in spots. Accumulations of pigment in region of macula.—Benson, *Brit. Med. Jour.*, 1878, Vol. 1, p. 371.

Man, aged 64. Gangrene of lids. Corneal epithelium necrotic. Exophthalmos, ophthalmoplegia externa. Retinal vessels in both eyes empty, with one exception. Disc of a grayish white discoloration. Coggin, *Am. Oph. Soc.*, 1879, 11, p. 570.

Gangrene of both lids of each eye. Orbital involvement. Optic atrophy.—Globe not affected.—Arlt, quoted by Lewin and Güllery, *loc. cit.*

Serious involvement of the meninges.—Biermann, *Klin. Monatsbl. f. Augenheilk.*, 1869, p. 91.

Man of 48. Lost perception of light four weeks after onset of erysipelas. Disc pale, arteries reduced. Pupils react to accommodation and convergence, but not to light. Ptosis and ophthalmoplegia externa. Orbicularis palpebrarum paralyzed. Orbital abscess.—Nettleship, *Trans. Ophth. Soc. United Kingdom*, 182, Vol. II.

Man of 23. Optic atrophy produced by compression by the edematous orbital tissues.—Despaquet, *Recueil d'Ophthalmol.*, 1880, p. 176.

Man of 51. On the third day of erysipelas, exophthalmos, amaurosis, ophthalmoplegia externa. Edema of the lids, ulcer of the cornea; later, macula. Optic disc white and completely atrophic.—Schiess, bei Schwendt, *Ueber Orbita-phlegmone*, Basle, 1882.

Man of 63. Edema of the left lids, closing palpebral fissure. Diminished rotation and tenderness of globe. When lids could be opened, complete amaurosis. Sharply defined white disc. Paralysis levator superior. Palp.—Pagenstecher, *Klin. Monatsbl. f. Augenheilk.*, 1870, s. 270.

Man of 49. Erysipelas. Eyes closed two weeks. Two months later V=15/100 R. and L. Discs reddish white, sharply defined. Vessels, especially arteries, diminished in lumen. F. V. contracted and "a sharply defined dimness of vision about the point of fixation."—Pagenstecher, *loc. cit.*

A soldier had had three attacks of erysipelas. Six months after the last attack the upper lids were swollen and drooping. Slight external strabismus and dilatation of the pupils. V=1/5.

Central scotoma. The centre of the disc showed beginning atrophy, the periphery was edematous. There were several atrophic patches in the choroid. An inflammation of the sheaths of the optic nerves was accepted as a cause.—Dufaut, *L'Union Medicale*, 1886, No. 171, p. 1002.

Erysipelas with exophthalmos and chemosis and great edema of the lids for four weeks. After opening the right eye it was totally blind. Changes in the blood vessels and haziness of the retina.—Schmaller, *Archiv. f. Ophthalmol.*, Vol. VII, Part 1.

An elderly man, with great edema of the lids for several days. When it was possible to open them the right eye was blind. Disc pale, and white on macular side; arteries reduced.—Hutchinson, *Ophthal. Hosp. Rep.*, V. 7, 1871.

Pregnant woman of 43. Six weeks after onset of erysipelas right circumocular tissues still infiltrated, movements normal, pupils dilated and fixed, cornea clear, disc white. Left globe ophthalmoplegia externa, abscess of cornea, prolapse of iris; later phthisis bulbi. Death.—Schiess, bei Schmidt, l. c. 321.

Woman of 27. Edema of lids, exophthalmos, chemosis, orbital abscess. Pupils small. Both eyes amaurotic, discs pale, vessels contracted. On the eighth day, fingers could be counted. Fourteenth day corneal ulcer on right eye followed by perforation. L. V.=6/9—Bayer, l. c., p. 222.

Girl of 10. Edema of the lids on right, exophthalmos, ophthalmoplegia externa, chemosis. V=fingers, 15 feet. Corneal ulcer. Orbital abscess. Amaurosis. Perforation of cornea, with escape of lens and vitreous. Phthisis bulbi.—Leber, *Archiv. f. Ophthal.*, Bd. XXVI, Part 3.

Both eyes affected. One with optic atrophy and a white disc, which showed an edematous margin, and the other a neuroretinitis, which shortly thereafter underwent atrophy.—Lubinsky, *Klin. Monatsbl. f. Augenheilk.*, 1878, s. 168. Nettleship, l. c.

Papillitis with pronounced exophthalmos downward. Recovery.—Karafiath. Szemeszet, 1884, I, p. 64.

Chorio-retinitis and maceration of the pigment in the region of the macula lutea. Atrophy of the pigment epithelium about the vessels. A wide band-like zone of atrophic pigmented epithelium between the macula and the disc—Hoesch, Ueber Erkrankungen, etc., Berlin, 1881. Herodes, Inaug. Diss., Würzburg, 1888. Carl, *Klin. Monatsbl. f. Augenheilk.*, 1884, s. 113.

Man of 54. Eyes closed several weeks from edema of the lids. When opened again, patient was blind. Exophthalmos. Right disc white. Vessels indistinct, lumen normal. Left, acute neuro-retinitis. Atrophy, white streaks about vessels. Later vessels obliterated in spots.—Lubinsky, *Klin. Monatsbl. f. Augenheilk.*, 1878, s. 168.

Post-erysipelas, two cases optic atrophy. In a third, orbital abscess, exophthalmos L. V.=O. Pupil dilated ad max. Aqueous hazy. Optic atrophy—R. T. + 4. Choked disc.—Halkermann, *Verlin d. Aerzte des Regier.* Augsburg, 32. *Versammlung*, 1894.

Girl of 16. On the fourteenth day of erysipelas, exophthalmos, ophthalmoplegia externa, dilatation pupils, media clear. Amaurosis. Retina white, vessels slender, discs only identified by vessels. Orbital abscess. Slight improvement in ocular symptoms before death.—Ginguel, *Recueil d'Ophthal.*, 1879, p. 65.

Man of 40 with lues. On the fifth day of erysipelas, exophthalmos and chemosis, bilateral. Myosis. Amaurosis. Corneal ulcer, right, due to exposure. Ninth day, fundus, left, milky white. Vessels almost reddish black and three times normal size. Extravasations. Same in right eye. The condition of vessels and fundus improved, but amaurosis complete.—Knapp, *Archiv. f. Augenheilk.*, B. XIV, s. 257.

Man of 36. Edema of the lids. Orbital abscess. Amaurosis right. Exophthalmos. Impaired rotation. Disc hazy, vessels partially converted into white strands. Exophthalmos and chemosis persisted for months. In two years the vessels had disappeared all but a few white streaks and two trunks filled with blood. Carl, *Klin. Monatsbl. f. Augenheilk.*, 1884, p. 113.

Pregnant woman of 41. Edema of lids, exophthalmos, ophthalmoplegia externa, chemosis. Orbital abscess. Pupil did not react. Amaurosis. Disc hazy, irregular in shape and white. Arteries thread-like, veins distended. Later, vessels disappeared almost entirely.—Hoesch, *Ueber Erkrankungen der Gefässwandungen in der Retina.* Berlin, 1881.

Man of 48. Edema of lids, exophthalmos, ophthalmoplegia externa. After opening the lids amblyopia, and objects seen in blue fog. Discs marble-like whiteness, vessels reduced. Pigment epithelium atrophic along the vessels. Necrotic areas of pigment epithelium between macula and disc.—Herodes, *Zur Casuistik der Fälle von Sehnerven Atrophie nach Erysipel.*, Würzburg, 1888.

Woman. Double exophthalmos, right amaurosis, disc and retina atrophic. Vessels reduced.—Jäger *Ophthalmoskop. Handatlas*, 1869.

Woman of 28. Edema of the lids, exophthalmos. Anesthesia inner half right eyebrow. Fifth day amaurosis right eye. After five months, disc white, not sharply defined. Vessels contracted and bordered by yellow stripe, empty of blood in places.—Jäger l. c. Fig. 75, Plate XVI.

Woman. Edema of lids, bilateral R. conjunctiva chemosed. Right upper lid fluctuating. Orbital abscess. Amaurosis. Embolism art. cent. ret. Vessels thread-like; disc pale, whitish haze. Cherry-red spots about macula. Four weeks later, total optic atrophy.—Emrys-Jones, *Brit. Med. Jour.*, 1884, Vol. I, p. 312.

Following erysipelas a unilateral and a bilateral blindness has been noticed. In the latter case, in the left disc were found beginning atrophic changes ten weeks after the onset. The arteries were narrowed and there were retinal hemorrhages, and later hemorrhages into the vitreous. It was assumed that the orbit had been slightly inflamed.—Snell, *Ophthal. Review*, 1893, p. 157. Terrien et Sesne, *Archiv. gener. de Medicine*, 1903, p. 2699.

Erysipelatous inflammation of the orbit where, after extinction of sight, complete restoration occurred.—v. Graefe, cited by Lewin & Guillery, *Die Wirkungen von Arzneimitteln und Giften auf das Auge*, Vol. 2, p. 31. Berlin, 1905.

Man of 25. Erysipelas. Pain in left eye. Edema of lids, exophthalmos, chemosis, amaurosis. Same condition followed in right eye. Left fundus not visible. Right, narrowed arteries and unequal venous distribution. Coma.—T. 40 degrees C. Death. P. M. Diffuse purulent infiltration of orbits. Abscesses in ocular muscles and veins. Sinus thrombosis, purulent meningitis, purulent pulmonary infarcts. The infection of the right orbit seems to have come through the sinus cavernosus.—Leber, *Archiv. f. Ophthalmol.*, Vol. XXVI, Part 3, p. 224.

Man of 21. Erysipelas followed by extreme exophthalmos, orbital abscess, dilated pupils, amblyopia. Ulcer of the cornea, chemosis, restricted rotation. Disc white, arteries almost absent, veins tortuous. Twenty-five days later, left otitis media suppurativa acuta. Epileptiform attacks. Temporal abscess. Death in six months, with cerebral disturbances. Autopsy. Left middle convolution was a mass of pus. Tubercular areas.

Purulent basilar meningitis, ostitis, orbital phlegmon. Optic nerve was completely replaced by developing connective tissue. The vessels were open.—Panas, *Gazette des hopitaux*, 1873, p. 1148.

Woman. Fourth day after the subsidence of an erysipelas, terrific pains in right orbit. Conjunctivitis. In forty-eight hours edema of the lids, exophthalmos, amaurosis, cornea hazy, ophthalmoplegia externa, pupil fixed. Left eye same condition but less marked. Cerebral symptoms and death on sixth day. Autopsy. Both orbits infiltrated with sero-purulent fluid. Both ophthalmic veins filled with pus. Pus in sinus cavernosus and right middle cerebral vein.—Poland, *Ophthal. Hosp. Reports*, Vol. I, 1857, p. 26.

Woman of 60. Comatose 14 days. Edema of lids. No exophthalmos, but pain in the eyes. Eyes not seen for 4 weeks. Then left eye amaurotic. Right eye normal. Symblepharon left lower lid. Left pupil one-half dilated. Disc flattened, greyish white discoloration. Arteries reduced, some obliterated.—Schenke, *Prag. med. Wochensch.*, B. III, No. 23, s. 229.

Woman of 59. Rapid diminution of vision, bilateral, after erysipelas one year previously. Fingers at 20 c. m. Discs atrophic, greyish white, slightly excavated. Vessels normal. Choroid atrophic near disc margin.—Parinaud, *Archives de med.*, 1879, 7 ser., T. 3, p. 644.

Man of 54. Enormous edema of lids. Orbital abscess. Total bilateral amaurosis. Death in four months. Autopsy; lids, orbit and globe normal. No bacteria. Both optic nerves oval at optic foramina and spongy. Nasal portion, yellowish grey; temporal, greyish white. Pronounced increase of connective tissue in temporal portion; nasal part retained its neuroglia. Central vessels normal.—Lewin and Guillery, l. c.

Woman of 26. Erysipelas lasting ten days. Then severe headache, fever and failure of vision to absolute amaurosis on eighteenth day. After forty-eight hours improvement of vision, but visual hallucinations. Floor gave reflection like a mirror and from an excavation in it flames burst forth. In six weeks counted fingers at 1 m. Concentric contraction F. V. bilateral. Central scotoma, left. Discs atrophic. Vessels normal. V. improved to 1/5.—Parinaud, *Arch. generale de med.* 1879, 7 ser. T. 3, Juin, p. 641.

Woman of 26. Recovery from erysipelas. Then deafness and amblyopia. Fourteen days later dilated pupils. Seventeen days amaurosis, right. V. was completely restored in four weeks.—Durioziez bei Gubler, *Arch. gen. de med.*, 5 ser., T. XV, 1860, s. 698.

Woman of 30. Following erysipelas, headache, deafness of the right ear, dense haze in right eye, cloudiness left eye, choreiform disturbances arms and legs, red flashes right eye. In eight weeks the eyes had very much improved. The other disturbances continued.—Durioziez bei Gubler, l. c. p. 703.

Woman of 32. Third attack of erysipelas. As sequelae great asthenia and anemia. Choreic twitching of head and progressive amblyopia to complete amaurosis. Pupils dilated and fixed. In a year the visual disturbances had disappeared.—Bourdon bei Gubler, l. c. s. 699.

Man of 40. Severe exposure during an attack of erysipelas. Twenty-four hours later amblyopia. $V=1/7$ Jäg. No. 17. Slight concentric contraction F. V.. Central scotoma. Venous hyperemia of fundus. Recovery in five or six months.—Thier, *Klin. Monatsbl. f. Augenh.*, 1900, s. 643.

Girl of 16. Edema right upper lid. Fourth day complete amaurosis. Pupil dilated but reacted. Disc hazy margin. Vessels narrowed. Fifteenth day ophthalmoscopic examination negative. V =motion of hand. Three days later changes in F. V. V =fingers at 12 ft. Rapid improvement. Twenty-fifth day complete recovery.—Weiland, *Deutsche med. Wochenschr.*, 1886, No. 39.

Man of 32. History excessive alcoholism. Erysipelas with coma for nine days. After recovery, severe headache, failing vision. L. V.=fingers $\frac{1}{2}$ metre. F. V. normal. Nyctalopia. Left disc injected, hazy. Haze over retina with distended veins and reduced arteries. Tenderness on pressure or movement of globe. Later neuro-retinitis in right eye. In fortnight slight improvement; in five weeks complete recovery right and left.—Vossius, *Klin. Monatsbl. f. Augenh.*, 1883, s. 294.

Man of 19. Recurrent erysipelas of right side. A few months later vision failed. $V=2/10$. After another attack R. V.=20/200, L. V.=1. Haziness of vitreous, retinal detachment, macular hemorrhage, yellow plaques. Picture that of nephritic retinitis. Later marked improvement. V =almost $2/3$. In two days relapse. Fundal picture much as before. V =fingers at 14 ft. F. V. reduced. Again, improvement. In six months

another relapse of erysipelas with failure of vision. Atrophic changes in fundus. Excentric scôtoma. $V=20/50$. Later $V=20/30$.—Vossius, *Klin. Monatsbl. f. Augenheilk.*, 1880, s. 410.

On account of a purulent cyclitis with unendurable pain, enucleation had to be done in one case. A hyaloiditis duplex which had been caused by erysipelas required a paracentesis and a culture of *S. erysipelatis* was obtained from the aqueous humor. (Compare Hoesch, Vossius, Fetzner, Hallerman, l. c., and Hausen (Nord. Ophth. Tijdschr., T. IV, p. 29) who observed a case of severe erysipelalous plastic iritis with considerable exudate on the anterior lens capsule which terminated favorably.)—Fortunati, *Reforma medica*, Ottobre, 1889.

Wagenmann found streptococci in the arterioles of a patient suffering from albuminuric retinitis who had died from erysipelas.—*Sitzungsberichte der Ophth. Gesellsch.* Heidelberg, 1896. Discussion zu Axenfeld.

Man of 26. During convalescence from erysipelas there appeared headache, fever, contracted and fixed pupils, coma with dilated pupils, left hemiparesis and death in 22 days. A seropurulent secretion was found in the lateral ventricles and a meningitis of the frontal lobe of the right hemisphere, thrombosis of the sinus cavernosus and of the right ophthalmic vein. Lewin and Guillery, l. c.

Streptococci were found in an eye which suddenly developed panophthalmitis without assignable cause; the culture of the *S.* resembled pneumococci closely. The vitreous was infiltrated with pus, the arteries thickened. The retina was destroyed. In front of it were masses of cocci and zooglea. The patient had frequently suffered from recurrent erysipelas.—Axenfeld, l. c.

Woman of 46. Repeated attacks of erysipelas. Developed visual disturbances after last attack. R. V.=fingers at 30 cm., L. V.=fingers 1 m. Hyaloiditis duplex. Floating opacities. Fundus invisible. Paracentesis gave cultures of streptococci in 48 hours.—Gillete de Gramont, *Bull. et mem. de la Soc. française de Ophthalm.*, T. X., 1892, p. 285.

A septic embolus of the right eye developed due to erysipelas. There were swelling of the lids, circumcorneal injection, tenderness of the ciliary region, hypopyon, haziness of the vitreous T.+2. Vision lost. Death on twenty-fourth day. Orbital involvement could not be demonstrated.—Cornwell, *Medical Record*, 1882, August 12th.

A patient of 45 who had had prodromal symptoms of glaucoma for a long time developed erysipelas after leeches and atropin had been used. An acute glaucoma developed in both eyes after a few days. Outcome bad despite the fact that iridectomy had been made. Another case developed facial erysipelas six days after an iridectomy for glaucoma. This operation was also unsuccessful.—Galezowski, *Recueil d'Ophthal.*, 1876, p. 202. Other cases are reported with a more favorable outcome.—Magauky, *Peterb. medic. Wochenschr.*, 1890, s. 301.

Man of 20. After erysipelas, sudden paralysis of the nerves of the superior branch of trigeminus. Slight exophthalmos: Recovery after inunction, although no evidence of lues. After several weeks a sudden transient, complete paralysis of left oculomotor. Chronic meningitis with orbital phlegmon and hemorrhage in the vicinity of the superior orbital fissure were given as causes.—Stoener, *Münch. med. Wochenschr.*, 1892, s. 863.

Girl of 18. During and after an attack of erysipelas, unilateral paresis of accommodation.—Schmidt-Rimpler, l. c.

Personal Communications of Damage to the Eye and Ear from Members of the American Laryngological Society, American Otological Society, American Academy of Ophthalmology and Oto-Laryngology, and American Ophthalmological Society.

David Coggin, Salem.—One case of loss of vision of both eyes after erysipelas.

D. W. Greene, Dayton.—Case of erysipelas following tenotomy of internal rectus of right eye. Loss of vision from atrophy of optic nerve.

F. P. Capron, Providence.—“A very few cases of ocular trouble due to erysipelas, but no record of the causes of the erysipelas.”

Wm. L. Wood, Portland, Ore.—One case of facial erysipelas in which the cornea of each eye was destroyed. The origin of the erysipelas was not traced to diseased nasal chambers.

Walter R. Parker, Detroit.—Two cases of glaucoma in the course of facial erysipelas. Both recovered without operation, although had there been no erysipelas, Parker would have advised immediate iridectomy in both cases.

Herbert Harlan, Baltimore.—One case inflammation of the eye of a young woman. Facial erysipelas following severe

conjunctivitis (probably streptococcus infection). Another similar case. Physician, aged 67. Conjunctivitis of unknown cause. Rather severe erysipelas on right side with great edema of lids of both eyes. Now under treatment and rapidly subsiding. No permanent damage to eye in either case.

R. S. Lamb, Washington.—Has seen a number of cases in which more or less extensive damage was done to the eye as the result of an attack of facial erysipelas, but as they were clinic and dispensary cases, he has no records.

J. C. Easton, Springfield, O.—Facial erysipelas. Edema of lids, sloughing tissues near inner canthus. Orbital abscess. Conjunctivitis. Ulcus corneae. Recovery with slight haziness of cornea and slight retraction of upper lid.

John E. Weeks, New York.—One case of blindness in both eyes due to erysipelas extending from face to orbits. Reduction of size of retinal arteries. Thrombosis of veins. Subsequent optic nerve atrophy. Patient, male 32 years. Erysipelas apparently extended from nasal mucous membrane. One case blindness in one eye following facial erysipelas of unknown origin. Patient, female, 24 years of age. Erysipelas most severe on right side of face. Right eye blind. Arteries small, veins thrombosed. Nerve eventually atrophied.

W. H. Peters, LaFayette.—“In the cases I have seen there has been chronic hypertrophic rhinitis. The patients have consulted me for tear sac trouble.”

Jas. W. Ingalls, Brooklyn.—*Case I.*—Erysipelas affected both sides of face—blindness of both eyes resulted. Soon died of pneumonia. *Case II.*—Facial erysipelas caused blindness of one eye. There was no sinus trouble. *Case III.*—Sloughing (partial) of both upper lids. Sight not affected to any extent. No disease of accessory cavities as far as known.

L. R. Ryan, Galzburg.—“Woman of 70 years operated upon for senile cataract. Erysipelas developed within 24 hours, involving nose, cheeks and forehead. Cornea sloughed and eye was lost. I afterward discovered pus deep in duct, also some involvement of the ethmoid. Case was undoubtedly of nasal origin.”

H. M. Fish, *Case I.*—“A lady patient, whose vision I knew to be normal, complained of a reduction of vision and redness and swelling of the upper lid, noted the day before; there had been some pain and trouble about the eye for several days. Marked violet-colored swelling of the upper lid and internal

angle of the orbit; pain on pressure under the frontal sinus. Media clear; disc edematous, its margins obscured. V.=10/20. In the middle meatus a mucopurulent secretion. Syringing the frontal sinus brought about complete restoration and normal vision in a few days' time." *Case II.*—"A patient recently consulted me for unilateral amaurosis, a complete optic atrophy, that followed an attack of facial erysipelas several years ago. * * Nasal examination showed a chronic "atrophic rhinitis"—the misnomer for an accessory sinus disease in only too many cases. In this case an accessory sinus disease was probably the primary lesion, the facial erysipelas and optic atrophy secondary thereto. In my opinion the veritable pathogenesis in the great majority of non-traumatic erysipelas-ocular cases is a strepto- or staphylococcic infection of a nasal accessory sinus or the upper nares with propagation to the orbit, cranium or subcutaneous tissue."

Joseph C. Beck, Chicago.—Case of facial erysipelas starting at ala nasi. Involvement of eye. Conjunctivitis, keratitis, ulcerus cornea. Termination, leucoma cornea.

Edward Jackson, Denver.—"I have seen glaucoma and optic atrophy from facial erysipelas, besides orbital cellulitis and inflammation of the lids. But I have not traced the erysipelas to disease of the nose or its accessory sinuses."

Joseph A. Andrews, Santa Barbara.—Case of erysipelas developing after abrasion and possible fracture of nose. Edema of lids, orbital cellulitis, exophthalmos. Death in two or three days from meningitis.

Allen Greenwood, Boston.—"Recent case of facial erysipelas developed severe phlegmon of the orbits with proptosis and destruction of both eyes and upper lids. Death. Origin of erysipelas not determined."

Frank R. Spencer, Boulder.—Case of facial erysipelas. Man aged 70, with carcinoma of liver and interstitial nephritis. Erysipelas extended to the cellular tissue of right orbit. Proptosis and convergence, chemosis, lids edematous, cornea and media hazy, hypopyon. Fluctuation upper external angle orbit. Incision liberated 8 cc. pus. Panophthalmitis. Coma and death one week later.

H. Bert Ellis, Los Angeles.—Sailor, aged 54 years. Dacryocystitis. Erysipelas. Severe case. Panophthalmitis. Subsequent enucleation. Man aged 57. Carpenter with only one eye. Developed erysipelas after slight injury of cheek. Orbit

of only eye involved. Lids board-like on second day. External canthotomy and opened several abscesses in lids. Gave 80 cc. streptolytic serum. Patient unable to move eyeball, saw flashes of light and was delirious. Recovery complete in eight days. Patient a sufferer from chronic atrophic rhinitis.

L. L. Doane, Butler, Pa.—*Case I.*—Man, aged 24. Seen in consultation on eighteenth day of facial erysipelas. Latter began at nose. Face enormously swollen. Many abscesses scalp and lids. Pus in left orbit. Evacuated. Recovery. V= $\frac{1}{2}$, right, fingers at six feet, left, without correction. Right normal with correction, left only improved a little. *Case II.*—Young married woman. Phlegmonous erysipelas of orbit and face. Incised orbit, no pus. Recovery. V=better than $\frac{1}{5}$ in affected eye and still improving.

H. M. Ray, Louisville, Ky.—Man, aged 60. Slight wound of eyebrow. Facial erysipelas, orbital cellulitis, optic neuritis and neuro-retinitis terminating in atrophy of optic nerve and complete loss of vision. One case optic nerve atrophy which was said to have followed injury and facial erysipelas, as in above case.

M. H. Post, St. Louis.—One or two cases years ago where atrophy of the optic nerve followed facial erysipelas.

Jas. F. McKernon, New York.—Female, aged 17 years. Destruction of portions of both eyelids. Sight improved somewhat later on. Supposed erysipelatous infection from old supuration of middle ear.

Edw. A. Shumway, Philadelphia.—Several cases of orbital cellulitis during attacks of facial erysipelas.

Robert Sattler, Cincinnati.—Two cases of unilateral optic nerve atrophy result of facial erysipelas, but could not trace cause to intranasal disease.

J. A. Stuckey, Lexington, Ky.—In two cases of erysipelas following: (1) frontal, and (2) ethmoidal disease, the eye was seriously threatened, but no permanent injury resulted.

Oscar Dodd, Chicago.—Wound of lid. Erysipelas orbital abscess. Blindness from optic nerve atrophy.

E. S. Strout, Minneapolis.—Facial erysipelas. Abscess of upper eyelid resulting in considerable deformity, which gradually disappeared.

Eugene Smith, Detroit.—Sloughing of skin of upper lid and panophthalmitis.

M. V. Hall, Warren, Pa.—Great edema of orbital tissues,

Vision nil. Death from pyemia and thrombosis of cavernous sinus.

C. A. Veazey, Philadelphia.—Two cases of optic nerve atrophy.

P. M. Farrington, Memphis.—(1) Exophthalmos and ophthalmoplegia externa. Death. (2) Exophthalmos and ophthalmoplegia externa. Thrombosis of the transverse sinus. Death.

Thos. F. Kellar, Toledo.—Exophthalmos and ecchymosis conjunctivae with each recurrent attack. Empyema antrum of Highmore.

F. C. Hotz, Chicago.—One case optic nerve atrophy following erysipelas.

E. C. Ellett, Memphis.—One fatal case of erysipelas in which the eyelids sloughed. One case in which skin of left upper lid sloughed, but not enough to cause deformity. Latter case had left frontal sinus and antral suppuration two years after the attack of erysipelas noted.

Wm. Merle Carhart, New York.—Erysipelatous infection extended to right eye, causing orbital cellulitis. Phlegmon was opened, but corneal ulcers and panophthalmitis followed. Infection extended to cranial cavity. Death from meningitis. Erysipelas followed nasal disease.

Jas. A. Spalding, Portland, Me.—Two cases seen in consultation. Men over 50 years, both blind with optic atrophy in each eye. Alleged cause was erysipelas of eyelids and forehead. No apparent cause except extremely cold weather. Both men were hostlers. Erysipelas may have been due to rubbing foreheads and eyelids with unclean hands after attending to horses.

Chas. Adams, Trenton.—Woman, aged 47. Sloughing of cornea, prolapse of iris. Severe and constant pain in phthisical bulb. Enucleation. T. S., aged 50. Insane asylum. Erysipelas involving cornea of right eye. Death in a few days from meningitis.

E. A. Kegley, Cedar Rapids.—Corneal ulcers due to an attack of facial erysipelas. Chronic dacryocystitis.

L. Haynes Buxton, Oklahoma City.—Robust girl of 18 years, with history of perfect health. Facial erysipelas complicated by secondary mastoiditis. Death from meningitis.

F. L. Henderson, St. Louis.—Furuncle at end of nose. Facial erysipelas, orbital cellulitis. Thrombosis cavernous and

lateral sinuses. Death. No disease of nose or accessory sinuses.

Wm. R. Dabney, Marietta, O.—(1) Thrombosis of central vein of retina in both eyes. Death from extension to the meninges. Chronic bilateral pansinusitis. (2) Complete atrophy of both optic nerves. Chronic bilateral antral suppuration.

W. F. Mittendorf, New York.—One case orbital abscess. Two cases sloughing of lower lids.

C. Barck, St. Louis.—Three cases atrophy optic nerve, ending in blindness.

D. E. Esterly, Topeka,—(1) First attack of erysipelas followed by ectropion lower lid. Second attack by perforating ulcer cornea. Iridocyclitis, etc. Enucleation. (2) Cicatricial ectropion left lower lid following erysipelas, Septal perforation. Hypertrophied lower turbinate. Hypertrophied middle turbinate with polypoid condition.

W. Cheatham, Louisville, Ky.—Case of acute middle ear suppuration in the course of erysipelas.

Edw. J. Bernstein, Kalamazoo.—Serpiginous ulcer of cornea which showed signs of healing before fatal termination of case.

G. E. deSchweinitz, Philadelphia.—“I have seen a good many ocular diseases directly traceable to facial erysipelas. I do not know whether in any one of these instances, however, there was a positive relationship noted between the attack of erysipelas and the disease of the sinuses or nasal chambers.”

H. F. Hansell, Philadelphia.—“A number of cases have required enucleation of the eye as a result of extension of facial erysipelas into the orbital tissues, others have had permanent loss of vision from atrophy of the optic nerve. In none was the cause traced to diseased nasal chambers or accessory sinuses. Most of the cases were fatal.”

C. R. Holmes, Cincinnati, O.—Man, aged 46. History of alcoholic excesses. Pansinusitis, R. & L. Chronic case with frequent exacerbations of inflammations in frontals. External operation opening both frontal sinuses during acute attack. Erysipelas followed immediately. Severe attack lasting two weeks. Corneal ulcer.

Louis J. Goux, Detroit.—One case of facial erysipelas, due to infection through ulcer of septum. Acute attack of double otitis media.

Thos. Hubbard, Toledo.—“One case in which general facial

erysipelas originated in nares, causing a probable acute sinus infection and very severe eye involvement. There was more or less destruction of conjunctiva and even keratitis with areas of opacity, but function was not materially impaired."

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Etymology of Erysipelas

